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PUBLIC HEALTH REPORTS

In this issue



U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

new vistas in Basic Science and Medical Research

The Clinical Center
of the
National
Institutes
of Health
Bethesda, Maryland



see overleaf

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PUBLIC HEALTH REPORTS

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I proudly dedicate this center to medical research as a symbol of our national concern for the health of our people, for their right to pursue happiness unhampered by crippling pain and illness.

In freedom, this building and the people who work here are dedicated to the endless struggle against human suffering.

We are dedicating it today—dedicating it to the open mind of research—dedicating it as an example of democracy heeding its obligation to free men, who, together, are self-governing.

—OVETA CULP HOBBY

WITH these words the Secretary of Health, Education, and Welfare on July 2, 1953, added a major resource to the public health and medical research potential of the United States of America.

Creation of the Clinical Center of the National Institutes of Health—research arm of the Public Health Service in the Department of Health, Education, and Welfare—is the latest in a train of developments which began in 1887 with the organization of scientific research endeavor by the then United States Marine-Hospital Service. In succeeding years, the focus of research was on major communicable diseases, and the methods were largely field epidemiology and laboratory study, basic and applied. The new Clinical Center permits an across-the-board approach via field, laboratory, and clinical routes. It facilitates, also, a coordinated effort against today's major and disabling diseases. "We have reached," Surgeon General Scheele said at the Clinical Center dedication, "a period of consolidation of forces for a broad attack on chronic diseases—an attack that can be fully successful only after years of intensive research. This means that we must not only press the search for new knowledge, but we must also use what we do know more intensively, more effectively."

Public Health Reports for September will report more fully on the dedicatory remarks of the Secretary and others and will present additional detail about the research program. For a description of the general philosophy and operating plans of the Clinical Center, see Public Health Reports, August 1952, pp. 819-823.

frontispiece . . .

The southern elevation of the Clinical Center is marked by the patients' solariums, with the silhouette of the auditorium jutting from the first floor.

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*C. M. Tarzwell, R. L. Stenburg, H. P. Nicholson, and
W. D. Lynn.*

16 pages and illustrations. A summary and information on availability appear on p. 824.



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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Nutrition Research

Potentialities in Chronic Disease

By WILLIAM H. SEBRELL, Jr., M.D.

HEALTH MAINTENANCE and constructive medicine—two emerging concepts in modern public health—weigh heavily in any consideration of nutrition in light of our aging population and the increasing significance of chronic disease.

We have made great strides against deficiency diseases, such as pellagra, beriberi, rickets, and goiter. While performing our day-to-day task of maintaining and extending these advances, we can now think in terms of constructive or optimum nutrition, with its implications for promoting healthful, productive longevity.

Aging, nutrition, and public health are directly related in various ways. Special feeding problems and nutritional needs of old people are of primary concern, and nutrition problems are common in the treatment of chronic diseases, for example, when digestion is impaired. Closely related is therapy by dietary means, as in diabetes and gout. An-

other—and fundamental—aspect is chronic disease research, a major objective of which is a better understanding of metabolism.

In much of this effort, primary attention is given to the complex interrelation of nutrients with enzymes, hormones, and other metabolic agents. Encouraging progress has been made, but our knowledge is still fragmentary and requires much supplementation. In other research not directly concerned with nutrition, knowledge and techniques are being developed that can be readily applied in the nutrition field.

Obesity and Chronic Disease

An important but little understood link between nutrition and chronic disease is obesity—a major problem called sharply to attention by actuarial experience, and now being investigated in several laboratories. About a quarter of the adult population is sufficiently overweight to impair health.

No better understood than the role of obesity in disease is the relation between obesity and the aging process. As we pass through the middle years, the percentage of body fat usually rises, though the overall weight may remain the same. Thus, among groups of standard weight, fat may comprise only 10 percent of the body weight in younger men, as compared with 21 percent in older ones. The prevalence of obesity increases to about age 40 for men and 50 for women, and declines after age 60. This decline is due not only to loss of fat, but also to the loss of fat people.

Dr. Sebrell is director of the National Institutes of Health, Public Health Service. On June 22, 1953, he spoke before the Institute of Food Technologists at its 13th annual meeting in Boston on "The changing age pattern of the American population, with its implications in the field of public health." This is a portion of his paper—that dealing with metabolic investigations related to chronic diseases. The full text, with citations, is scheduled for publication in Food Technology for September under the title of "Aging, Nutrition, and Public Health."

*The wee son turned the shining future up;
His father plowed the green past under.*

—From *Man and Boy*, by Alma Robison Higbee



Dr. Goldberger and Dr. Sebrell

The Joseph Goldberger Award in Clinical Nutrition is presented by the Board of Trustees of the American Medical Association for outstanding and sustained work in the field of clinical nutrition. The 1952 award, which includes a gold medal and a check for \$1,000, made possible by a grant from the Nutrition Foundation, was given in December to Dr. William H. Sebrell, Jr., Assistant Surgeon General of the Public Health Service and Director of its National Institutes of Health. He was selected because of his outstanding work in the field of riboflavin deficiency, in pellagra prevention with Dr. Goldberger, and for his continued work in the field of clinical nutrition. The previous recipients of the award were Dr. Randolph West and Dr. Fuller Albright. In response to the presentation of the award, Dr. Sebrell discussed the present status and the future of nutrition as it relates to medicine in America. His remarks were published in the *Journal of the American Medical Association*, May 2, 1953, pp. 42-44.

On pages 737-746 are two recent papers by Dr. Sebrell—one dealing with nutrition research, the other with public health aspects.

JOSEPH GOLDBERGER'S life (1874 to 1929) "was a Horatio Alger experience common to other great Americans. He was born on a peasant tenant farm in Czechoslovakia in 1874 and brought to New York City when he was 7," according to Williams (p. 279, *The United States Public Health Service, 1798-1950*). "For the early part of his life he delivered groceries for his father on the lower East Side. At 16, he decided on a course of civil engineering, but 2 years later switched to medicine after he heard the Harvey Lecture given by a Bellevue Hospital College physician. In 1895 he graduated second in his class at Bellevue, where he had acquired a reputation as a hater of routine but a master of case history writing. To him every case was a great and absorbing mystery, the solution an exciting challenge. After a 2-year try he decided that private practice was not his field and he entered the Marine Hospital Service. He performed brilliant and dangerous work on typhus fever, operating always at the epidemic scene. He also made important studies of the Mexican form of typhus fever and of yellow fever. But the chance to exercise his talents, his greatest contribution to humanity, came when he was put in charge of pellagra investigations."

Continued from page 737

The fact that obesity is correlated with aging and chronic disease does not in itself imply a causal relation. Unknown etiological factors may be common to these conditions. In various studies, however, caloric restriction has prevented cancer in mice, prolonged greatly the life of rats, and reduced the signs of diabetes in humans. Moreover, striking decreases in the incidence and severity of diabetes and hypertension accompanied undernutrition and loss of weight in certain European countries during both World Wars. It may reasonably be assumed then that practical advances against obesity would have far-reaching effects upon public health.

This problem is fertile for research. We should like to know, for example, what benefits in longevity accrue to the middle-aged person who reduces and maintains the reduction. We need clarification of the mechanism, psychological or metabolic, that leads to overeating.

Wading through the wilderness of conflicting theories as to the cause of pellagra, and in the face of those who claimed to have proved that it was infectious in origin, Goldberger's first theory, which he announced in 1914, was that pellagra was due to a deficiency in diet. This he proceeded to prove conclusively and devised ways in which the disease could be prevented and cured. Even so, he did not discard the possibility that pellagra might have an infectious element until he proved to his own satisfaction that this could not be true. This he did by injecting blood from patients with pellagra into himself, his associates, and even into his own wife. Furthermore, he made pills from the intestinal discharges and the skin rash scales from pellagrous subjects and ate them as further proof that no infectious agent was involved.

Later he sharpened his ideas about the dietary origin of pellagra to include the concept that a "vitamine" deficiency was involved. This was a quite new concept in disease etiology since Funk had coined the name "vitamine" only in 1911. Later his ideas shifted to include the possibility that an amino acid deficiency, specifically cystine and tryptophan, was causative. Both of these theories were proved after Goldberger's untimely

death, although it was not until 1945 that the amino acid tryptophan was clearly implicated.

Never one to form a theory and fail to test it, Goldberger and his associates reported in 1922 on tests with cystine and tryptophan, although their claims for therapeutic value were very conservative. For reasons unknown, he never reported on some dramatic results which he and his associate Tanner obtained with tryptophan alone. Nicotinic acid was not known as a vitamin during his lifetime so it could not be tested.

Goldberger's influence on nutrition research continued long after his death and continues even today. The dog, which he introduced and established as a tool in pellagra research, is still used today. The dietary data which he and his associates collected have been used recently to recalculate the human requirement for nicotinic acid.

Not the least of his amazing abilities was his capacity to gather brilliant associates who ably continued the work after his death. His career in research was marked by courage, rare intellectual insight, wisdom, and perseverance. In the words of Dr. Arthur M. Stimson: "He illuminated everything he touched and won the admiration and affection of his associates."

—JAMES M. HUNDLEY, M.D.

We should define the role of heredity—a primary factor in the obesity of certain strains of mice. And we may hope that such knowledge will improve means for controlling obesity through public health programs.

Fat Metabolism and Atherosclerosis

This subject of obesity provides a point of transition to the role of fat metabolism in the development of cardiovascular diseases. Among these is atherosclerosis, the most serious form of hardening of the arteries, which causes 9 out of 10 heart attacks and seriously disables hundreds of thousands of persons. This is a type of arteriosclerosis in which the lining of the artery thickens and pushes inward. Deposited cholesterol, a fatlike substance, is a part of this growth.

Observations on patients following weight reduction have shown a decline in circulating cholesterol of the type suspected in atherosclerosis. To what extent the lower cholesterol level

is due to reduced fat ingestion rather than reduction of weight has not been determined.

Research on atherosclerosis is proceeding along many lines. Most investigators, however, work from the hypothesis that the body's fat-handling system plays a part in the development of the disease. Not only have abnormal cholesterol-bearing molecules been found in the blood of sclerotic patients, but some animals on high cholesterol diets develop sclerotic lesions.

Investigators at the National Institutes of Health recently identified a "clearing factor," which diminishes the cloudiness of blood occurring after a fatty meal. In normal persons this condition clears automatically within a few hours, but in others it persists, possibly leading to atherosclerosis. The clearing factor not only eliminates the cloudiness, but appears to break down the abnormal cholesterol-bearing molecules that are particularly suspect.

The fact, however, that the body readily

synthesizes cholesterol from simple, ever-present substances compels caution. Moreover, we do not yet know whether the dietary level of the substance is of practical significance. Cholesterol metabolism involves such nutrients as choline, other B vitamins, and some amino acids; and various nutritional deficiencies affect the deposition. For persons with atherosclerosis, the best diet known at present is a balanced one, such as normal people require. If other problems, such as hypertension, are involved, a special diet may be indicated.

Cancer and Nutrition

Cancer is another chronic disease in which the science of nutrition is contributing valuable information. Dietary manipulations have been shown to exert pronounced effects on cancer causation in animals. Caloric restriction prevents or delays the appearance of various tumors; and restriction of certain amino acids gives similar results. Choline deficiency, on the other hand, induces liver cancer in the rat. These observations have no immediate practical value, since the preventive diets abolish breeding capacity and choline occurs in a wide variety of foods. Such findings, however, are important leads for further research.

In human beings, cancers already established have shown little response to dietary alternations; but in animal experiments, alternate restriction and supply of a vitamin, such as riboflavin or pantothenic acid, has appreciably prolonged life. Vitamin antagonists have produced similar effects: in some children, chemical antagonists to folic acid, such as aminopterin, have been of temporary benefit in leukemia. Recent advances in leukemia concern certain pyrimidine compounds. When administered to animals, these drugs in combination with a folic acid antagonist appear to inhibit neoplastic growth more than antifolics alone. For nutritionists, the exploration of such antimetabolites offers rich opportunities for extending knowledge of normal and abnormal growth.

Bone and Joint Diseases

The study of arthritis, the principal crippling disease, has been hampered by lack of a method for producing the disease in experimental animals. Recently, however, several investi-

gators have produced arthritic changes by dietary means.

At Washington University in St. Louis, a condition resembling osteoarthritis was induced in mice of a highly inbred strain. A high fat diet was fed to one group, a high protein diet to another. The mice that received the fat-enriched diet showed an acceleration of skeletal aging and an increased incidence of osteoarthritis, whereas protein enrichment retarded aging of the joints and delayed the onset of joint disease.

Other groups of workers, one at Kansas City College and another at Cambridge University, report a disease in vitamin-C-deficient guinea pigs that resembles rheumatoid arthritis. It is interesting that these joint changes can be prevented with cortisone.

A recent advance now being applied clinically concerns osteoporosis, a brittle condition of the bones due to decalcification. It is primarily a disease of the aged, but may occur at any age as a late phase of arthritis. At the Russell Sage Institute of Pathology, osteoporosis is being treated successfully with the metal strontium. After maximum calcium storage, strontium can still be stored in the bones. Maximum retention of both minerals is achieved with the aid of auxiliary agents—vitamin D and sex hormones. This, as well as the fact that osteoporosis often results from ovarian insufficiency, clearly suggests a relation between nutrition and hormones for which we have no explanation.

Nutrition science, using new biochemical approaches, offers much promise against diseases of the bones and joints. Even the study of an inorganic nutrient such as calcium presents attractive possibilities. The skeleton is now regarded as a living tissue, particularly in view of tracer studies showing that calcium enters and leaves the skeleton with considerable rapidity. Little is known, however, about the regulation of calcium metabolism. How, for example, is calcium mobilized to the area of a tuberculous lesion? In leprosy, though a bacterial disease, why do entire bones sometimes disappear as a result of resorption? Explanations of such metabolic disturbances could aid in the prevention of arthritic deformity.

Research for Optimum Nutrition

Nutrition science has made great strides in the past, but the opportunities for further progress are limitless. Long-term investments in fundamental research represent an approach historically proved to offer the best returns in the long run. There is a constant exchange, of course, between basic and applied science. Research in nutrition, applied as well as fundamental, will help workers throughout the world in promoting health and long life.

A constructive approach requires that we strive to attain, and to maintain, optimum health while repairing damage. Fortunately, the population as a whole has lost much of its complacency concerning nutrition. Food technology, through food fortification, increased availability and palatability of foods, and other innovations, is a major aspect of the public health approach through which the need for

specific nutritional therapy may some day be eliminated. The human body is remarkably adaptable, and inherent abnormalities of digestion and metabolism may lead to compensatory dietary practices. Unfortunately, however, the contrary is frequently the case; selection and consumption of food often obey a misleading appetite, and the result may be damage and disease.

Nutrition science is only beginning its venture into gerontology and the major chronic diseases. Whether substantial contributions are achieved in the near future depends largely on the cooperative efforts of many individuals and groups. No longer is scientific progress by lone investigators the rule, as in the days of Pasteur and Ehrlich. Many disciplines must coordinate their attack. Nutrition research and theory must be converted to food therapy, nutrition knowledge, to public health gains.

Enrichment

a Public Health Approach to Better Nutrition

By WILLIAM H. SEBRELL, Jr., M.D.

WE ARE inclined in these modern times to take our knowledge of nutrition for granted and to underestimate the importance of its application. Consider for a moment the problem of malnutrition in earlier days. Vasco de Gama, in his search for a water route to the East, rounded the Cape of Good Hope and returned with only a third of his crew, the rest having died of scurvy. At one time the channel fleet of the British Navy could not be manned because of the prevalence of scurvy among the crews. In the late 19th century, 40 percent of the seamen in the Japanese Navy died of beriberi; and in Italy at about the same time, the reported cases of pellagra exceeded 104,000. One by one, these and other serious diseases re-

sulting from specific dietary deficiencies have yielded to science.

The progress of nutrition research, however,

Dr. Sebrell presented this paper at Toronto on January 26, 1953, as Canada inaugurated a program of flour and bread enrichment. Speaking before the First Nutrition and Enrichment Conference of the Baking and Milling Industries, he characterized the Canadian enrichment program as "one more forceful blow in the prevention of malnutrition . . . further indication of the increasing role of enrichment in the health and strength of nations." His discussion, here somewhat condensed, appears in full in The Canadian Hospital for June 1953.

is only part of the story of effort in the nutrition field. The complete picture includes what might be termed the public health movement—the application of nutrition knowledge through industry, agriculture, education, government, and, of course, the medical profession. In this movement, an important trend in Europe and North America has been a broadening of the attack to extend preventive measures to successively larger groups of people.

Early Applications

Available knowledge prior to World War I was used mainly for the prevention or alleviation of dietary deficiency diseases in the individual. Citrus fruits and juices were fed to seamen, and later to children, to treat and prevent scurvy; cod liver oil was used in treating rickets; extracts of rice polishing, in beriberi. The next step, an organized public health approach, was the planned distribution of preventive dietary supplements, such as cod liver oil, butter, and iodized salt. Meanwhile, the isolation of vitamins progressed; and just prior to World War II, it became practical to improve staple foods with synthetic nutrients as a means of preventing dietary diseases in large populations.

In the United States, on a growing scale, vitamin D was added to milk and vitamin A to margarine. Thus, the principle being used in the control of goiter with iodized salt—the fortification of food—was extended to rickets and vitamin A deficiency. Early in 1941 the same broad approach was applied to the prevention of beriberi, pellagra, ariboflavinosis, and iron-deficiency anemia, when enriched bread and flour were introduced.

Public preference for highly refined foods had left the American diet deficient in many important respects. For example, the patent milling process, by removing most of the germ and bran shorts from flour, reduces the thiamine content about 90 percent and the niacin, riboflavin, and iron 70 to 85 percent. White bread and refined sugar and fats are widely preferred for taste, appearance, and durability. Together they furnish a large proportion of our calories. This resulted in less than satisfactory amounts of essential nutrients per capita and

led inevitably to dietary diseases, especially in poorly fed sections of the population.

The enrichment of bread and flour had therefore received the enthusiastic endorsement of the Nation's foremost nutrition scientists, including the American Medical Association's Council on Foods and Nutrition and the National Research Council's Food and Nutrition Board. With the advice of these groups, the Food and Drug Administration established standards for enriched wheat products, permitting specified amounts of the four nutrients, thiamine, niacin, riboflavin, and iron. Certain other substances, such as calcium, vitamin D, and wheat germ, can also be added, but this has not been done on a wide scale. Calcium and other nutrients are often supplied in bread through use of dry milk solids, a practice that should be extended.

Status at Pearl Harbor

By the time the country entered World War II, the enrichment of flour and bread had become well established. Within another year about three-quarters of the bakers' white bread and almost all family flour was enriched on a voluntary basis. A further step in the application of nutrition knowledge was now feasible—nationwide control of specific dietary diseases; and a program to that end was soon launched. During periods of war, foods that are costly to produce tend to become scarce, and greater dependence is placed upon cereal products, the least expensive foods in terms of man-hours and acreage. Consequently, it was apparent that cereals as an important part of the national diet must contain essential nutrients.

Serious consideration was given to the possible use of long-extraction flour, which retains some of the vitamins and mineral-rich portions of the wheat. Some reasons against requiring the product, besides the general preference for white flour, were its perishability, its limitations for pastry, and the dependence of the animal food industry upon the residues of patent milling. Moreover, it was believed that the prohibition of white bread and flour would be difficult or impossible to enforce in the United States. There was also the success achieved with voluntary enrichment, as well as the fact

that enriched products were better supplied with the nutrients in question—an important health consideration.

In January 1943 the Federal Government issued war food order No. 1, requiring the enrichment of all bakers' white bread with thiamine, niacin, riboflavin, and iron. Subsequently, the nationwide nutrition movement brought about improved agricultural practices, better nutrition education, a national school lunch program, and advances in food handling, preservation, and distribution. Since October 1946 when the war food order ceased to be effective, enrichment of bread and flour has not been required by Federal regulation, but more than half the States have passed laws making enrichment mandatory. In the remaining States, voluntary enrichment is being continued extensively, according to recent surveys by the industry.

Assessment After a Decade

After nationwide practice of more than 10 years, what have been the health gains due to better nutrition, and to what extent are they attributable to the enrichment program? What, if any, have been the harmful effects? What is the future of food enrichment as a means of attacking malnutrition throughout the world?

Unequivocally, we can say that there is no evidence of harm from the program, nor reason to expect it. If the diet contains slightly more than the required amount of a nutrient, the excess is simply excreted. These statements apply also to the products commonly fortified with iodine and vitamins A and D. There is a wide margin of safety between recommended and harmful levels.

As to health gains, on the other hand, there is ample evidence of the efficacy of the nutrition program and every reason to ascribe much of the success to bread and flour enrichment. No more dramatic history of health progress could be cited than that of pellagra in the United States. In the 1920's and 1930's, this was our most serious deficiency disease.

Pellagra and Niacin

Pellagra results from a diet low in two nutrients, either of which will prevent it—the

vitamin niacin and the protein component tryptophan. Mild cases are much commoner than extreme cases, and mortality rates reflect only a small proportion of the pellagra problem. In a region of high prevalence, at least 33 cases per death were found in 1917, before control measures were instituted. At one time, an estimated 200,000 were afflicted with pellagra in the United States. In 1928, at the height of reported mortality, there were approximately 7,100 pellagra deaths, or 6 per 100,000 population. Nearly 98 percent of those occurred in southern States where most of the available land was used for nonfood crops, such as cotton and tobacco.

For the past 25 years, the death rate from pellagra has shown a general downward trend. This is attributable not only to the national nutrition program, but also to better medical treatment, shifting of the population, extensive changes in agricultural practices, and gradual economic improvement in the south through the establishment of industry there.

It is interesting to note the pellagra mortality at key points in the nutrition program. By 1937, the year niacin was isolated, pellagra mortality was about half that of 1928, or 2.5 per 100,000. Cures with niacin were reported that year by several clinicians, and thereafter the decline was more rapid. In 1943, 2 years after niacin-enriched foods appeared on the market, the rate was 1; by 1950 it had dropped to 0.2, representing an unprecedented low of 260 reported deaths in the entire country.

In North America, mortality data do not reflect the true health importance of the deficiency diseases, since very few affected persons die. It is the number of cases—the people limited in their capacity to work and enjoy life—with whom we are especially concerned. Nearly all of the estimated 200,000 cases of 20 years ago were in the south. In contrast, among 10,000 recent admissions to the Hillman General Hospital in Birmingham, Ala., not a single pellagra was found—and this, at one of our permanent pellagra research centers in an area where the disease was once rampant.

At the Cincinnati General Hospital, where 34 cases were diagnosed in 1939, only 1 case was seen from 1946 to 1948. If enrichment had done

nothing but help control this one disease, it would have paid for itself many times over in lives saved and people rehabilitated.

Even among chronic alcoholics, once commonly afflicted, pellagra has become rare. In 1948 and 1949, the Army Medical Nutrition Laboratory examined approximately 16,000 alcoholic inmates of the Chicago House of Correction and found only 2 with pellagra, 3 with ariboflavinosis, and 1 with possible beriberi. The decline of those diseases among alcoholics clearly dates from the introduction of enrichment.

B-vitamin Deficiencies

Beriberi is a disease resulting from lack of thiamine, another vitamin of the B group. Like other deficiency diseases, beriberi has no geographic limitations, though more than 90 percent of the cases are reported among rice-eating peoples. How serious it can be as a public health problem is shown by the fact that in the Philippines in 1948 beriberi was second only to tuberculosis as a cause of death. Small outbreaks have occurred in such places as Australia, Iceland, and Labrador. In the United States, Great Britain, and other western countries, beriberi has been frequently reported among chronic alcoholics and the inmates of institutions; but it is not an important cause of death among peoples consuming a variety of foods. In its less severe forms, however, there was evidence that thiamine deficiency was sufficiently prevalent in the United States to warrant addition of the vitamin to flour and bread.

Ariboflavinosis—riboflavin deficiency disease—is reported frequently in various parts of the world. It often occurs in conjunction with other B-vitamin deficiencies, especially pellagra. Ariboflavinosis was not recognized as affecting humans until 1939. As a result, the incidence in the United States was not accurately estimated, but there is no doubt of its former prevalence.

Like pellagra, these B-vitamin deficiency diseases—beriberi and ariboflavinosis—have declined in the United States as a result of improved nutrition to which enrichment has demonstrably contributed.

General Effects of Enrichment

While the demonstrated prevention of specific deficiency diseases is the real test of enrichment, other evidence of its effect on the nutritional status of the population should not be ignored. Over the past 10 or 15 years, there has been a general elevation in the nutritive value of our national diet. This means primarily a higher vitamin, mineral, and protein intake. As shown in studies by the U. S. Department of Agriculture, the most striking increases have been in thiamine, niacin, riboflavin, and iron—with a sharp rise beginning about 1941, when enriched bread and flour were introduced. In 1945 and 1946, the peak years of per capita consumption, these four nutrients exceeded prewar levels by a third to a half.

The average American in 1945, as compared with what he would have received without enrichment, obtained in his food 27 percent more thiamine, 19 percent more niacin, 12 percent more riboflavin, and 17 percent more iron. The benefits were greatest among the lower income group, whose diet is poorest and incidence of deficiency diseases highest.

Thus, we are able to trace various specific health gains due to better nutrition and even to assign a considerable measure of that progress to the enrichment program. Other advances in health are undoubtedly associated with the nutrition movement, but their contribution is harder to prove. Maternal and infant deaths, for example, have declined to unprecedented levels, and nutritional changes have been significant. Similarly, there have been appreciable increases in growth rate and stature. Downward trends in mortality from infections, particularly tuberculosis, have paralleled the elevation of nutritional status. In short, the benefits of improved nutrition have exceeded our most optimistic expectations.

Problems Ahead: Chronic Diseases

By no means, however, does all this imply that our national diet is now perfect, nor that malnutrition in the United States is a thing of the past. I have discussed only the advances, the favorable trends. Many problems still confront us, some of which mount in significance

as various factors lengthen the life span and increase the number of older people in the population.

One such problem is our high mortality from chronic diseases frequent among the aged, such as the cardiovascular diseases, cancer, diabetes, and cirrhosis of the liver. Another problem, the extent of which is uncertain, is that of borderline dietary deficiencies—conditions presenting an indefinite clinical picture, but nevertheless one of suboptimal health.

With regard to the problems attacked through enrichment, we know that anemia, by generally accepted standards, is still widespread in the United States, especially among women. This is thought to be largely nutritional in origin. The commonest form of anemia—secondary, or hypochromic—is attributed to iron deficiency; but the incidence has shown little change, despite the increase in the average consumption of iron. Does this mean that the problem is overestimated because of an unrealistic health standard, that iron is poorly utilized, or that iron deficiency is not responsible for the condition? Only further research can provide an answer.

There are many other important research problems in nutrition. Our approach to these must remain broad. The history of science shows conclusively that the long-range point of view—the emphasis upon fundamental investigation, often with little promise of practical reward—is the most productive approach in the long run. Practical applications of basic knowledge will suggest themselves.

For the most part, the remaining nutrition problems require further research and intensive education. Enrichment should certainly be continued and, along some lines, extended. Not only would a relaxation of that effort permit a relapse of nutritional status, with a high probability of increasing deficiency disease, it would also undermine our nutritional foundation, the bulwark of cheap staple foods—bread, flour, milk, salt, margarine, and so forth—upon which the Nation's health would depend in an economic or other calamity. The National Research Council has described enrichment as "low-cost insurance against certain nutritional ills."

Nutritionists and allied workers in the United

States appreciate the importance of developing their programs in full recognition of world nutritional needs. Today, serious world problems critically involve us all—problems that often reflect the ratio of food supply to population. Established techniques intensively applied can often remedy the local shortage of a vitamin—as shown recently in the Philippines, where rice enrichment and other measures reduced beriberi deaths in an experimental zone by 90 percent or more. The successful expansion of this program in the Philippines would be a major public health advance for that country.

Enrichment, Education, Research

Enrichment is a powerful weapon against malnutrition, but it must not become the sole or final effort. Nutrition research must be intensified; and sound programs of nutrition education—the essential link between professional knowledge and the improvement of food practices—must be vigorously pursued.

These are aspects of the public health program in nutrition to which industry and government can contribute, as they have done notably in the past. Let me stress the necessity of cooperation between industry and government in this movement. It has been our experience that businessmen are deeply interested in the Nation's health, that they recognize its great importance and that they want to be helpful and to do the right thing. They also have their feet on the ground and properly act only when strongly convinced. Such cooperation is highly productive in the field of education. Here, industry can bring to bear effective techniques and attractive media, which government agencies cannot obtain. Whenever government and industry participate in a sound program of nutrition education, as they have done in the United States, material progress in public health can be expected.

Nutrition education, as its main objective, should seek to establish public demand for an adequate diet, taking into account a wide range of consumer incomes. The physician, health officer, nurse, teacher, and other key persons in the community must be prepared to guide individuals and institutions in selecting the right foods; and for this, they must be skilled in the

practicalities of feeding—food values relative to cost. In commercial advertising, a greater effort should be made to show the proper relation of the promoted product to good nutrition as a whole. Finally, community leaders, advertisers, nutritionists, and others in the role of educator should focus primarily upon the housewife, who selects and prepares the meals and guides in the formation of food habits.

Sound food habits must always be the major objective. It is unlikely, however, that enrichment will ever be entirely superseded by informed food selection, since food values vary seasonally and geographically, and selection to some extent is economically determined. The modern attack upon malnutrition should be spearheaded by enrichment, backed by education, and controlled by research.

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Agglutination of *Treponema Pallidum* In Syphilitic Serums

By CHARLOTTE P. McLEOD, Sc.D., and HAROLD J. MAGNUSON, M.D.

NUMEROUS unsuccessful attempts have been made to demonstrate specific agglutination of pathogenic *Treponema pallidum* in syphilitic serum. Most such attempts have met with failure due to the tendency of the organisms to agglutinate spontaneously. Interest in the subject was revived by the report of Tani (1) that Antiformin-killed spirochetes showed no such spontaneous clumping, but were agglutinated in syphilitic serum after an incubation period of 24 hours; and that organisms so treated provided satisfactory antigens for the serodiagnosis of syphilis. More recently, specific agglutination of *T. pallidum* was reported by Gain (2) who obtained antigens which showed no spontaneous agglutination from syphilomas of X-irradiated rabbits; and also by Hardy and Hollander (3) who prepared satisfactory heat-killed spirochete suspensions from lesions of syphilitic rabbits treated with cortisone.

The agglutination technique described in the present paper was devised by bringing together the findings of two separate lines of investigation. The experiments of Tani (1) were confirmed and extended. At the same time, there was in progress a study of complement in the

Treponema pallidum immobilization test (TPI). In testing the fresh serum of various animal species for complement activity, it was noted that fresh steer, or other bovine, serums caused disappearance rather than immobilization of the spirochetes, and also caused agglutination of sensitized sheep cells. It was then found that the agglutination of *T. pallidum* in syphilitic serum was greatly enhanced by the addition of fresh steer serum. These effects of fresh steer serum in both the TPI test and the agglutination test were due to the presence of conglutinin (4) in addition to complement.

By means of the agglutination technique with fresh steer serum the presence of syphilitic antibody may be demonstrated in a test which utilizes killed spirochetes and is completed in only 2 hours. It will be shown that this reaction appears to have a specificity comparable with that of the TPI test, and sensitivity many times as great.

Methods

The Nichols strain of *T. pallidum* was employed in all experiments. Serum samples from normal or syphilitic human donors were stored at -20° C. until tested. Fresh steer or fresh guinea pig serum was distributed in suitable amounts in small containers and stored in a CO_2 chest at -76° C., and samples were not thawed until immediately before use. The steer serum was frozen on the day the blood was collected; the guinea pig serum usually was frozen on the day following collection.

TPI tests were set up by the method of Nelson and Mayer (5) with modifications and controls

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previously described (6, 7). Unmodified Nelson's medium (8) was used in titrating serum from patients with untreated primary, secondary, or latent syphilis. Five times the usual concentration of sodium thioglycollate (9) and 5 percent of inactivated normal rabbit serum were added to the medium in all other experiments. Each assay tube contained a total volume of 0.45 cc., which included 0.3 cc. spirochete suspension, 0.1 cc. of undiluted steer or guinea pig serum as complement, and 0.05 cc. of test serum or dilution. TPI assays were incubated for 16 hours at 37° C.

In tests with sheep erythrocytes, suspensions of cells and dilutions of serum were made in physiological saline (0.85-percent sodium chloride). Sensitized cells were prepared by mixing equal volumes of a 3-percent sheep cell suspension and a 1:500 dilution of rabbit amboceptor. (Amboceptor was obtained from the Venereal Disease Research Laboratory, Chamblee, Ga.) Unsensitized cells were similarly prepared with saline instead of amboceptor. Sheep cell suspensions were used in a volume of 0.4 cc. In testing for residual complement in TPI assays or in complement titrations, the tubes were incubated in a water bath at 37° C. for 30 minutes.

In preparing the antigen used in agglutination tests with fresh steer serum, spirochetes were obtained from testicular lesions of rabbits inoculated 8 to 10 days earlier. The testicles showing 3+ induration were sliced in an egg cutter and extracted with 5 to 10 cc. of 0.85-percent sodium chloride per testis. Three such extractions were carried out for 1 hour at room temperature on a rotating shaker. The saline extracts were pooled and centrifuged for 10 minutes at a low rate of speed to sediment the larger tissue particles. The supernatant was then spun for 1 hour in a Sorval angle centrifuge (approximately 20,000 G) to sediment the spirochetes. The supernatant was discarded, and the organisms were resuspended in saline and killed by heating in a water bath at 56° C. for 40 minutes. The suspensions then were further diluted with saline to contain approximately 60 spirochetes per high power field, and were stored at 4° C. Antigens so prepared showed no spontaneous agglutination

during storage periods which lasted for as long as 3 months. However, there often appeared, during storage, a finely granular precipitate in which some of the spirochetes became enmeshed. This material was present to a greater or less degree in the different suspensions, and usually could be removed or greatly reduced by centrifugation.

Agglutination Studies

In preliminary studies, the findings of Tani (1) with Antiformin-killed spirochetes were repeated, and other methods of killing the organisms were investigated. (Antiformin, which contained not less than 6 percent sodium hypochlorite, was purchased from American Antiformin Co., Brooklyn, N. Y.) unwashed spirochete suspensions were treated with Antiformin in final concentrations of 0.1 to 0.25 percent for a period of 30 minutes at room temperature. The organisms then were sedimented by centrifugation and resuspended in saline containing 0.5 percent phenol. One-tenth cubic centimeter of antigen was added to 0.1 cc. of syphilitic serum dilution, and the mixtures incubated in a water bath for 26 to 27 hours at 37° C. Specific agglutination was obtained by this method, and a positive control serum (human pool B) regularly showed 3+ to 4+ agglutination in the 1:32 dilution.

In further experiments, aliquot portions of the unwashed suspensions were subjected to different treatments. One portion was untreated and the spirochetes allowed to die on standing at 4° C. The organisms in the other portions were killed by treatment with Antiformin, by heating at 56° C. for 40 minutes, or by the addition of a final concentration of 1:4,000 Mapharsen, 0.2-percent phenol, or 0.1-percent formalin. Agglutination similar to that with Antiformin-killed antigens was obtained with the untreated, heated, or Mapharsen-killed organisms. All of the phenol-killed antigens showed some degree of spontaneous agglutination, and formalin-killed organisms failed to agglutinate.

Six different saline testicular extracts were used. Four of these provided satisfactory antigens. They were obtained from lesions of rabbits inoculated 7, 9, 11, or 11 to 13 days

earlier. Two extracts obtained from 9-day lesions or from pooled 7- to 14-day lesions were unsatisfactory, showing 1+ to 4+ spontaneous agglutination in all antigens except the formalin killed. The Antiformin-treated antigens showed the least amount of spontaneous agglutination, and the phenol-killed organisms showed the greatest amount.

Use of Fresh Steer Serum

In testing serum from numerous animal sources for complement activity in the TPI test (data to be published), considerable variation was noted in the serum from different species. While none of the serums showed immobilizing activity in the absence of hemolytic activity as measured by the usual rabbit amboceptor-sheep cell system, these two properties were not necessarily present in the same degree. Of particular interest in these studies was the finding that fresh steer serum caused complete disappearance of the spirochetes under the conditions of the TPI test. Also when a syphilitic serum was tested quantitatively with fresh steer serum, the spirochetes which reappeared at the end point of the titration were motile and there was no evidence that immobilization occurred between the stages of disappearance and reappearance. When tested under identical experimental conditions, the "disappearance titer" with steer serum and the immobilization titer

with guinea pig serum were similar after 16 hours' incubation. However, it was found by reading the tests at 6 hours that disappearance proceeded more rapidly than immobilization. Disappearance occurred also when aliquot portions of the suspensions were heated at 56° C. for 40 minutes, and the tests incubated under either aerobic or anaerobic conditions.

In tests for residual complement there was 4+ agglutination but no hemolysis of sensitized sheep cells in tubes containing fresh steer serum. The tubes containing inactivated steer serum showed neither hemolysis nor agglutination. Table 1 shows the results of titrating steer serum against sheep cells as described under "Methods." Both sensitized and unsensitized cells were lysed in high concentrations of fresh steer serum, and were agglutinated in relatively high dilutions. The activity of the fresh serum was slightly higher against the sensitized than against the unsensitized cells. Inactivated steer serum showed no lytic activity, but a low degree of agglutinating activity against only the sensitized cells.

In further experiments with steer serum in the TPI test, it was noted that disappearance of the organisms sometimes took place in control tubes which contained spirochetes plus fresh steer serum, or spirochetes plus fresh steer serum and normal serum. Also a negative end point was not obtained in the titer of the positive control serum. In duplicate assays run

Table 1. Effect of steer serum on sheep cells
[0.4 cc. of serum or dilution + 0.4 cc. of cell suspension]

Dilutions of steer serum	Fresh steer serum				Inactivated steer serum			
	Sensitized cells		Unsensitized cells		Sensitized cells		Unsensitized cells	
	Lysis	Agglutination	Lysis	Agglutination	Lysis	Agglutination	Lysis	Agglutination
0.....	3+-----	4+-----	3+-----	4+-----	Negative	2+-----	Negative	Negative.
1:2.....	1+-----	4+-----	±-----	4+-----	do-----	Negative	do-----	Do.
1:4.....	Negative	4+-----	Negative	3+-----	-----	-----	-----	-----
1:8.....	do-----	4+-----	do-----	2+-----	-----	-----	-----	-----
1:16.....	do-----	4+-----	do-----	1+-----	-----	-----	-----	-----
1:32.....	do-----	2+-----	do-----	Negative	-----	-----	-----	-----
1:64.....	do-----	Negative	do-----	do-----	-----	-----	-----	-----
1:128.....	do-----	do-----	do-----	do-----	-----	-----	-----	-----

NOTE: The designations 4+, 3+, 2+, or 1+ refer to the degree of hemolysis, or to the degree of agglutination of cells which resisted hemolysis.

Table 2. Results of TPI tests on serums from patients with suspected biological false-positive reagin tests, using fresh serum from both guinea pig and steer as sources of complement

Total serums tested	Results with guinea pig serum				Results with steer serum			
	Positive	Negative	Doubtful ¹	Nonspecific immobilization ²	Positive	Negative	Doubtful ¹	Nonspecific immobilization
20	3	12	1	4	6	13	1	0

¹ The serum from this patient was positive in the agglutination test.

² Three of these patients were positive and one negative in tests with fresh steer serum.

with the same spirochete suspension and guinea pig complement, all controls were satisfactory. From the results with guinea pig complement it seemed clear that the spirochetes were not sensitized in vivo. It seemed more probable that steer serum contained a natural antibody to *T. pallidum* as well as to sheep cells, and that the effect of this antibody was apparent under the conditions of the TPI test only when the spirochete suspension contained relatively little anticomplementary or other interfering substances.

It was later found when washed killed antigens were used that disappearance of the organisms always occurred in fresh steer serum, and agglutination, but no disappearance, in heated steer serum. Immobilizing antibodies could not be demonstrated in heated steer serum when assayed in the TPI test with guinea pig complement even when twice the usual amount of serum was tested. The presence of "reagin" in steer serum was suggested by a positive Kahn test. However, VDRL and Mazzini tests were negative.

Serum samples from 20 patients with suspected biological false-positive reagin tests were examined by the TPI technique, using both fresh guinea pig and fresh steer serum as sources of complement. The two tests on the same patient were always run in the same assay. Table 2 shows the results of this study. There was agreement between the results obtained with the two methods except in four serums which showed nonspecific immobilization when assayed with guinea pig complement. Three of these serums were positive and one was negative when tested with steer serum. One serum which gave a doubtful result by

both methods was later positive in the agglutination test with fresh steer serum.

Use of Syphilitic and Steer Serums

Spirochete suspensions washed in saline and heat killed, as described under "Methods," were used as agglutinating antigens. In studying the effect of adding fresh steer serum to the agglutination mixtures, it was noted that the organisms disappeared in controls of fresh steer serum, and showed 2+ agglutination in controls of heated steer serum. By suitably diluting the steer serum in saline, these effects were overcome, and sufficient activity remained to greatly enhance the agglutination of *T. pallidum* in syphilitic serum.

In setting up agglutination tests, 0.1 cc. antigen, 0.1 cc. of 1:7 fresh steer serum, and 0.1 cc. of inactivated test serum or dilution were mixed in Wassermann tubes and incubated for 2 hours in a shaking machine at 37° C. In reading the tests, 0.01 cc. of each mixture was measured onto a slide and examined under a 22 x 22 mm. cover slip with the high dry objective.

In reading the tests, consideration was given both to the number of unagglutinated spirochetes per field, and to the proportion of organisms which were agglutinated. This is illustrated in table 3 which also shows a typical titer obtained on pool B, a positive human control serum. There were 20 spirochetes per field with no agglutination in the controls of antigen plus saline, antigen plus active or inactive complement, or antigen plus normal serum with active complement. In the control of heated complement and undiluted pool B, one-half the total number of spirochetes were unagglutinated, and one-half were agglutinated into

small clumps. This was designated as 2+ agglutination.

In the titer of pool B with active complement, there appeared to be complete disappearance of the spirochetes in the undiluted serum. In the 1:10 and 1:20 dilutions, there was 4+, or practically complete, agglutination with only one or less unagglutinated spirochete per field. The agglutinated organisms were contained in a few large, very tightly packed clumps which were usually located by searching the slide with the low-power objective. In the 1:40 dilution, there was an average of two single spirochetes per field, and 3+ to 4+ agglutination. The clumps in this dilution were less tightly packed, smaller, and more numerous than in the two preceding tubes. The 1:80 dilution showed 2+ agglutination with approximately one-half the organisms agglutinated in small- and medium-sized lacy clumps. In higher dilutions, there were 18 to 20 single spirochetes per field, and little or no agglutination.

At the same time pool B was run with fresh guinea pig serum which was active in the TPI test, and a titer only slightly higher than that without complement was obtained. Strongly positive agglutination occurred in the undiluted syphilitic serum after 2 hours' shaking, and in the 1:10 dilution after 23 hours' shaking. In the absence of shaking, agglutination occurred less rapidly with both steer and guinea pig complements.

Experiments were then set up to study the

mechanism by which fresh steer serum enhanced spirochetal agglutination. Pool B was titered as described above with fresh steer serum, with fresh guinea pig serum, and with fresh guinea pig serum plus 0.05 cc. of a 1:3 dilution of steer serum which had been heated for 30 minutes at 56° C. The tests were read after shaking for 2 hours at 37° C. In the titer with fresh steer serum, the 1:40 dilution of pool B showed 3+ agglutination; in the test with fresh guinea pig serum, only the undiluted pool B showed 4+ agglutination; and when tested with fresh guinea pig serum plus heated steer serum, 4+ agglutination was obtained in the 1:40 dilution. The control of undiluted pool B plus heated serum showed only 2+ agglutination. It seems clear from these results that the property of steer serum which enhanced agglutination was congenin (4).

Using the technique with fresh steer serum, pool B has been titered a total of 24 times, with six different antigens. The reproducibility of the titers was well within the limits of technical error, and different antigens did not vary greatly in sensitivity. The dilution giving 3+ to 4+ agglutination ranged from 1:40 to 1:80 in 13 tests with 2 antigens, and from 1:80 to 1:160 in 11 tests with 4 antigens.

The specificity of the agglutination test is shown in table 4 which contains a comparison of the results of standard serologic tests (STS), TPI, and agglutination tests on serum from 154 presumably nonsyphilitic human donors. The

Table 3. Agglutination of *T. pallidum* in the presence of syphilitic serum and fresh steer serum
[Shaken 2 hours at 37° C.]

Tubes ¹	Single <i>T. pallidum</i> per field	Agglutination
1. Saline + saline.....	20/1	No clumps.
2. Heated steer serum (1:7) + saline.....	20/1	Do.
3. Active steer serum (1:7) + saline.....	20/1	Do.
4. Active steer serum (1:7) + normal serum.....	20/1	Do.
5. Heated steer serum (1:7) + pool B ² undiluted.....	10/1	2+ small and medium clumps.
1. Active steer serum (1:7) + pool B undiluted.....	0/25	Disappearance.
2. Active steer serum (1:7) + pool B 1:10.....	1/10	4+ tightly packed clumps.
3. Active steer serum (1:7) + pool B 1:20.....	1/1	Do.
4. Active steer serum (1:7) + pool B 1:40.....	2/1	3+ -4+ clumps less opaque.
5. Active steer serum (1:7) + pool B 1:80.....	10/1	2+ lacy clumps.
6. Active steer serum (1:7) + pool B 1:160.....	18/1	Occasional small clump.
7. Active steer serum (1:7) + pool B 1:320.....	20/1	Do.

¹ Each tube contained a total volume of 0.3 cc. composed of 0.1 cc. antigen + 0.1 cc. of each indicated reagent.

² Pool of positive human syphilitic serum.

Table 4. Results of qualitative serologic tests on presumed nonsyphilitic donors

Donors	Total	STS			TPI		Agglutination		
		Positive	Negative	Not tested	Positive	Negative	Positive	Negative	Doubtful
Medical students.....	46	-----	-----	46	0	46	0	43	3
VDEL staff.....	29	-----	-----	29	0	29	0	29	0
Hospital patients.....	66	0	66	0	0	66	0	66	0
Hospital employees.....	12	0	12	0	0	12	0	12	0
Blood donor.....	1	0	1	0	0	1	1	0	0
Total.....	154	0	79	75	0	154	1	150	3

donors included medical students, Venereal Disease Experimental Laboratory staff, hospital patients with diseases other than syphilis, hospital employees, and one blood donor. In VDRL tests, there were no positives, 79 serums were negative, and 75 not tested. In TPI tests, there were no positives, and all 154 serums were negative. In the agglutination tests, there was 1 positive test, 3 doubtful reactions, and 150 negatives. The positive serum was obtained from the one blood donor, and the three doubtfuls, from medical students.

Table 5 shows a comparison of the results of STS, TPI, and agglutination tests on serum from patients with untreated primary, secondary, or latent syphilis. There were serums from 12 cases of darkfield positive primary syphilis. In STS tests, 8 were positive, 3 were negative, and 1 was not tested. In the TPI tests, 5 were positive, 6 negative, and 1 showed nonspecific immobilization. In the agglutination tests, 10 were positive and 2 negative. The serums from the 66 secondary and 33 latent syphilis patients were positive in all of the three tests.

A comparison of the results of quantitative

STS, TPI, and agglutination tests on serum from 15 patients with untreated primary, secondary, or latent syphilis is shown in table 6. Agglutination titers on the 10 positive primary serums ranged from 1:20 to 1:160. Agglutination titers on the 15 secondary serums ranged from 1:20 to 1:2560; and on the 15 latent serums ranged from positive with undiluted serum to positive in the 1:1280 dilution. There was no correlation between the agglutination titers of these serums and the TPI or STS titers.

The result of measuring the relative sensitivity of the TPI test and the agglutination test by another method is shown in table 7. Two-fold dilutions of syphilitic serums were made in saline, and these saline dilutions were then further diluted twofold in normal human serum, with similar dilutions in saline as controls. These second dilutions were tested quantitatively in the TPI and agglutination tests. It is apparent that dilution with human serum did not interfere with the antibody titration, and that the agglutination titer of the syphilitic serum was significantly higher than the TPI titer.

Table 5. Results of qualitative serologic tests on human syphilitic serum

Serum	Total tested	STS			TPI			Agglutination	
		Positive	Negative	Not tested	Positive	Negative	Nonspecific immobilization ¹	Positive	Negative
Primary.....	12	8	3	1	5	6	1	10	2
Secondary.....	66	66	0	0	66	0	0	66	0
Latent.....	33	33	0	0	33	0	0	33	0

¹ In tube containing inactive complement.

Table 6. Results of quantitative serologic tests on serum from patients with untreated syphilis

Patient No. and stage of syphilis	STS		TPI titers ¹	Agglutination titers ¹		
	VDRL titers	Kahn units				
<i>Primary</i>						
18821	1:64	256	>1:16	1:80	4+	1:160 2+
19529	1:16	32	1:5	1:80	4+	1:160 2+
19574	1:16	64	1:25	1:40	4+	1:80 2+
20495	1:8	16	Positive undiluted	1:40	4+	
20307	1:16	64	do	1:20	4+	1:40 2+
21279	Positive	1	do			Unsatisfactory. ³
18415	1:64	512	Unsatisfactory ²	1:20	3+	1:40 2+
19521	1:4	16	Negative	1:40	4+	
20039	1:4	16	do	1:20	3+	1:40 2+
18588	1:4	8	do			Unsatisfactory. ³
19538	1:2	8	do			Dc.
19884			do	1:40	3+	
20321	Negative	Negative	do	1:20	3+	1:40 1+
20073	do	do	do			Negative.
20011	do	do	do			Do.
<i>Secondary</i>						
19957		32	1:4	1:1280	3+	1:2560 2+
19307	1:32	64	1:4	1:640	3+	1:1280 2+
19639	1:64	128	1:8	1:320	3+	1:640 2+
19623	1:128	256	1:4	1:640	4+	1:1280 2+
19044	1:32	64	1:16	1:640	4+	1:1280 2+
21296	1:16	64	1:8	1:640	3+	1:1280 1+-2+
18520	1:16	16	1:90	1:80	3+	1:160 Negative.
18982	1:32	64	1:96	1:20	4+	1:40 2+
19354	1:32	128	1:9	1:80	3+	1:160 Negative.
19450	1:32	128	1:34	1:80	4+	1:160 2+
19591	1:8	64	1:64	1:40	3+	1:80 2+
18906	1:64	128	1:25	1:80	3+	1:160 2+
19762	1:16	256	1:125	1:40	3+	1:80 2+-3+
19793	1:64	256	1:125	1:640	3+	1:1280-1+
19802	1:16	32	1:125	1:40	3+-4+	1:80 2+
<i>Latent</i>						
18794	1:32	64	1:8	1:320	3+	1:640 Negative.
18695	1:16	32	1:25	1:1280	3+	1:2560 1+
18567	1:8	16	1:16	1:320	4+	1:640 2+
19287	1:4	16	1:32	1:320	3+	1:640 2+
19065	1:32	64	1:16	1:320	3+	1:640 2+
19500	Positive	4	1:32	1:160	3+	1:320 2+
18905	1:2	2	1:4	1:320	4+	1:640 2+
18288	1:16	32	1:125	1:640	3+	1:1280 2+
18287	1:8	16	1:94	1:80	3+	1:160 1+
18481	1:32	64	1:75	1:80	4+	1:160 1+
18411	1:16	32	1:25	1:160	3+	1:320-1+
18425	1:4	4	1:25	1:10	3+	1:20 2+
18582	1:32	128	1:25	1:40	3+-4+	1:80 2+
L. J.			1:2	Undiluted	4+	1:10 1+
18523	1:8	16	1:5	Do.	4+	1:10 1+

¹ Titers expressed as the actual dilution of serum tested.

² Unsatisfactory in TPI test. Serum showed nonspecific immobilization in control tube containing inactive complement.

³ Unsatisfactory in agglutination test. Serum too grainy and amount insufficient to centrifuge and repeat test.

Table 8 shows the results of TPI and agglutination tests on serums from patients with suspected biological false-positive reagin tests. A total of 69 serums was examined. In the

TPI test, 28 were positive, 15 negative, and 26 gave nonspecific immobilization which was not prevented by the addition of penicillinase (?). Of the 28 serums positive by the TPI test, 27

Table 7. Effect of diluting syphilitic serum in saline or in normal human serum on the sensitivity of the TPI and agglutination tests

Original dilution of serum in saline	TPI titers ¹ —Original saline dilutions further diluted in—		Agglutination titers ¹ —Original saline dilutions further diluted in—	
	Saline	Serum	Saline	Serum
1:2	1:4	1:4	1:80	1:80
1:4	1:2	1:4	1:20	1:20
1:8	Undiluted	Undiluted	1:20	1:40
1:16	Negative	Negative	1:40	1:20
1:32	do	do	1:10	1:10
1:64	do	do	Undiluted	Undiluted
Control of undiluted serum titrated in saline	1:8		1:160	

¹ Expressed as the actual dilution of serum tested.

were positive by the agglutination test, and 1 was negative. Of the 15 serums negative by the TPI test, 4 were positive by the agglutination test, and 11 were negative. Of the 26 serums giving nonspecific immobilization in the TPI test, 13 were positive by the agglutination test, and 13 were negative.

Discussion

A method has been described for enhancing the agglutination of *Treponema pallidum* in syphilitic serum by the addition of fresh steer serum. By means of this technique the presence of syphilitic antibody may be demonstrated in a specific test which is completed in only 2 hours. While it is not the object of the present paper to propose the use of this technique as a diagnostic test at present, it has certain obvious advantages over the serologic procedures currently used in the diagnosis of syphilis. Killed spirochetes are used as the

antigen, the antigens may be stored for periods of months in the refrigerator or at -20°C ., and the materials could be made available to any serologic laboratory. Studies to date indicate that the agglutination test may have a specificity comparable with that of the TPI test. It also appears to have greater reproducibility than the TPI test, and several times the sensitivity.

The mechanisms involved in the reactions of *T. pallidum* with syphilitic antibody and steer serum are under continued study. It was shown in experiments reported here that the enhancing effect of fresh steer serum in the agglutination test was due to the presence of conglutinin (4). It was found in later experiments not described here that the disappearance of the organisms under the conditions of the TPI test was also caused by conglutinin. It is not yet known whether the disappearance of the spirochetes under the conditions of either the TPI test or the agglutination test is a result of lysis or of

Table 8. Results of TPI and agglutination tests on serum from patients with suspected biological false-positive reagin tests

Total serums tested	TPI positive—28		TPI negative—15		TPI nonspecific ¹ —26	
	Agglutination positive	Agglutination negative	Agglutination positive	Agglutination negative	Agglutination positive	Agglutination negative
69	27	1	4	11	13	13

¹ Nonspecific immobilization in tube containing inactive complement.

unusually strong agglutination. Although results with syphilitic serum absorbed with lipoidal antigen indicate that the agglutination test is probably not a measure of reagin, the identity of the antibody has not been determined. The possible identity of this agglutinating antibody with the TPI antibody (5) or other agglutinating antibodies (1-3) is now being investigated.

Summary

A study has been made of the effects of adding fresh steer serum to mixtures of *T. pallidum* and syphilitic serum. Because of its content of congenitine, the steer serum caused disappearance rather than immobilization of the spirochetes under the conditions of the TPI test, and greatly accelerated and enhanced the clumping of the organisms in the agglutination test. The agglutination test performed by this method appears to compare favorably both in specificity and sensitivity with the TPI test.

ACKNOWLEDGMENT

Standard serologic tests on the steer serum were obtained through the courtesy of Ad Harris, Venereal Disease Research Laboratory, Communicable Disease Center, Public Health Service, Chamblee, Ga.

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Venereal Disease Postgraduate Course

The 21st venereal disease postgraduate course will be held at Chapel Hill, N. C., from September 28 through October 2 under the sponsorship of the United States Public Health Service and the North Carolina University Schools of Medicine and Public Health. The course is open to all physicians. Applications for enrollment should be sent to Dr. Harold Magnuson, Director, Venereal Disease Experimental Laboratory, Box 687, Chapel Hill, N. C. The courses previously were held twice annually at the United States Public Health Service Medical Center at Hot Springs, Ark., until the center was closed last June.

American Medicine in a Changing Society

By OVETA CULP HOBBY

IRONICALLY, every advance of man seems to bring its own problems—the Greeks spoke of it as “cost of opportunity.” A changing medical practice and a changing society have presented us with an embarrassing number of what are paradoxically problems of progress. It is the solution of these problems which now concerns us all.

There is little controversy on the objective to be attained—the best medical care possible for people. It is the means to this end which raises the problems. One is the problem of supply. If we are to achieve our objective, the supply of medical care must be adequate and available to all the people. The second is the problem of using these medical resources under a policy which safeguards the traditional principles of our democratic American pattern.

Supply of Medical Care

The problems of supply we are facing include, first, problems relating to ways in which all the fruits of modern medicine can be brought within the reach of all the people. A vast array of new techniques of treatment involving costly equipment, costly medication, costly training, and the services of an army of ancillary personnel are now involved in the

The Secretary of Health, Education, and Welfare gave this address, here somewhat condensed, before the House of Delegates of the American Medical Association on June 1, 1953, during the 102d annual meeting of the Association in New York City. Her remarks are reproduced in full in the proceedings of the House of Delegates in the Journal of the American Medical Association, June 20, 1953, pp. 740-742.

problems of modern medicine. Although the doctor-patient relationship remains dominant, it is no longer a simple relationship. It has been complicated by the introduction of new specialties and factors, as well as by new emphasis on prevention of disease and renewed responsibility for the total health problems of the patient against the background of his situation. Modern medicine is not only complex, it is expensive to supply.

A second problem of supply relates to meeting the cost of research underlying these medical advances and continued progress. A third problem relates to the supply of physicians in the face of the mounting cost of medical education.

Use of Medical Resources

In the use of our medical resources, we must first be careful to work within the democratic principle. Democracy is a doctrine of free will, grounded on the demonstrated ability of man to judge his own individual and common interest on the basis of his common human experience. The freedom of man, therefore, to make his own choices is essential to human dignity, development, and progress. Hence, although man is a social animal and must act with his fellows to achieve the common goals of humanity—freedom and well-being—his right to self-direction must be safeguarded, in such social action, by the establishment of the social controls involved only with his active consent.

The touchstones of democracy are “freedom,” “consent,” and “individual responsibility,” not responsibility vested in an “elite” group with power to make choices and provide for the in-

dividual. In democracy, no one need walk alone, but he does his own walking.

Since we are pledged to the democratic private enterprise system as the system which creates the greatest opportunity for man's achievement of dignity and freedom, any policy which impairs its principles is regressive. The impairment of the principle of free choice and consent in medical care which is inherent in a compulsory program of medical care, therefore, represents a break in the fabric of our democratic system. This break occurs, moreover, in an area in which the value of the elements of "choice" and "consent" is intensified because of the very nature of the service involved. Under such a policy a long turn toward an authoritarian system would be made. The course of this social pathology is dangerously progressive and difficult to reverse.

Economic Considerations

It is clear that the democratic principle to which we are committed is not served by so-called socialized medicine. Such medical practice, moreover, not only violates the democratic principle of free choice and consent but is unsound from an economic point of view—the second principle involved in the use of our medical resources.

Democracy not only protects man's rights to free choice, it is the most economical form of social-political organization man has yet devised. For when the government provides a service, the cost of a round-trip ticket for the dollar from the taxpayer to the government back to the taxpayer must be paid. Hence, the interposition of the government between the doctor and the patient is expensive, and the total resources for medical care, research, and education are, at the last, reduced by the amount of this cost. This is the point which seems never to be fully recognized by those of socialist persuasion.

Equal Opportunity

A third principle which must govern the use of our medical resources is equal opportunity for medical care—the heart of our overall objective. Although in the short run it might appear that socialized medicine may achieve

this end, in the long run its involved and costly administration, its deadly effects on free inquiry and research, and its impairment of democratic rights to free choice ultimately defeat our long-view purposes of continuing medical progress and maintenance of the high standards of medical care which the American medical profession has achieved for this country under a private voluntary system. "Equality" of medical opportunity becomes a hollow victory under these conditions.

Socialized medicine is not a satisfactory solution of our problem. What are the alternatives? As a nation we cannot afford to fail to make available the best medical care possible to all our people. We must find ways to resolve the problems we set forth earlier.

Physicians' Responsibilities

This Administration is looking, first, to the physicians of the country for leadership in meeting this challenge, and we look with confidence.

The history of medicine is a record of devoted service to humanity. The American medical profession has long proved its devotion to these ideals. Its accomplishments constitute a proud record in medical history. The demands of today are only the continuing challenge in this long history of constant adaptation to a changing society, but never have these problems been more onerous and critical than today. I can put these issues no more clearly or forcefully than they were expressed by your president, Dr. Louis H. Bauer (1):

"I am afraid that too many physicians are indulging in wishful thinking that the clock can be turned back and that we can again practice medicine as it was practiced 25 years ago, without involvement in all these socioeconomic problems. It is idleness to believe that. These problems are upon us; our whole way of life has been altered, and, whether we like it or not, we cannot close our eyes to it. If we fail to participate and lead in the solution of these problems, the solution will be taken out of our hands, and that solution will not be a happy one. No problem can be solved well if those most competent to advise hang back and ignore it.

"So it is up to those of us who are active in the affairs of medicine to educate our colleagues and to stimulate their interest in what may be termed the nonscientific aspects of medicine. Unless we handle these nonscientific matters properly, the scientific aspects will suffer, too."

The Citizen and the Community

Second, this Administration looks to the individual citizen to meet his responsibilities: by making full use of resources made available to him through modern medicine for the preservation of his health; by prudent participation in prepaid plans for medical care; and by assumption of common responsibilities for the advancement of the health of our Nation.

Again, we have faith that the individual citizen will meet this challenge. His understanding of the meaning of the questions involved, however, should be widened. Under any plan he pays. He should learn more about what his dollar buys under a compulsory program administered by the government and under a private, voluntary system and what his democratic rights mean to him.

Third, this Administration looks to the community, acting both through its private voluntary associations and its governmental bodies, for help in meeting this challenge.

We are all familiar with the tremendous role of private foundations in the advancement of medical science in this country. It has been estimated that in 1951, philanthropic foundations such as Rockefeller Foundation, Ford Foundation, Commonwealth Fund, New York Foundation, Russell Sage Foundation, Guggenheim Foundation, and many others, contributed \$10 million toward the support of medical research; and voluntary health agencies, such as the American Cancer Society, Damon Runyon Medical Foundation, and National Foundation for Infantile Paralysis, contributed another \$10 million (2). The American Medical Association itself is a donor to causes of medical advancement.

Role of Government

Governmental bodies also carry responsibilities in working out plans of medical care which

meet our conditions and achieve our objectives. The role of government, particularly the Federal Government, is a basic question in our problem. This Administration believes that under a democratic system government has an important role to play.

The broad framework of this government responsibility was defined by President Eisenhower in his State of the Union Message last February when he said: "First, the individual citizen must have safeguards against personal disaster inflicted by forces beyond his control; second, the welfare of the people demands effective and economic performance by the government of certain indispensable social services."

The Department of Health, Education, and Welfare has been created to discharge these responsibilities of the Federal Government. These responsibilities may be broadly defined as those functions which serve the health of the Nation without affecting the doctor-patient relationship in medical practice.

Public Health and Research

The first area of concern is public health—prevention of disease; improvement of standards of sanitation in all areas, including food and drugs; and assistance and consultations to local communities in establishing and maintaining health services. The achievements of government at all levels cooperating with voluntary groups in advancing public health in these fields are too well known to recount.

Another appropriate area of government function is research. Although the achievements of private and voluntary organizations and groups in research have been phenomenal, the increasing scope of research, its cost, its basic and indispensable role in modern medicine make it a field in which government support is sought.

Rehabilitation

Another area in which the Congress has assumed an obligation for medical care is in the rehabilitation program—the restoration of the disabled. This is one of the areas in which private and voluntary medical services have worked closely with government agencies with success, and without prejudicing the principle of voluntary and private medical practice in a service administered by a government agency.

This type of service is a development in democratic society for the community care of those who are unable to provide essential services for themselves. This aspect of our problem is increasing and is becoming one of the underlying issues in the present situation. Because of tremendous advances in medicine, people are living longer and the incidence of chronic disease is increasing. The implications of these facts, and the problems they pose, are well understood.

Medical Education

There remains another area where the pressure of need is compelling a review of all possible methods of solution; that is the area of medical education, where the financial crisis is growing. A recent estimate, based on data accumulated by the Association of American Medical Colleges, shows that medical schools need approximately \$20 million a year to meet current inadequacies. The medical profession has begun to contribute substantial sums (nearly \$1 million to date) to the National Fund for Medical Education, organized to meet this emergency. In May, the fund reported that in addition to this money, corporate gifts amounting to \$570,882 had been received with an additional \$300,000 in sight. At best, only 10 percent of the amount needed is now available.

There must be a renewed drive for voluntary support of medical education and increased support by local governments, for these

problems of medical education cannot go unanswered.

The importance of government responsibilities in these areas is considered of such moment by this Administration that a position for a Special Assistant for Health and Medical Affairs has been set up in the Department of Health, Education, and Welfare.

A Partnership

In closing, let me quote again from Dr. Bauer (1): "We can solve our difficulties if all contribute by sound thinking, by looking forward, not back, and by constant striving toward an ideal that we shall never reach, because we shall steadily increase that ideal."

We already have patterns of cooperation and joint action set by years of close partnership between government, the people, and the medical profession. We can see the results of this partnership in every phase of our national health. We need only to push forward together to achieve a better health care for the people of the United States.

We have the resources. We have the will. We shall surely find the way.

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State and Territorial Health Officers' Conference

The 1953 annual conference of the Surgeon General of the Public Health Service and Chief of the Children's Bureau with State and Territorial health officers, State mental health authorities, and representatives of State hospital survey and construction agencies will be held from November 4 through November 7. Open sessions will be held in the auditorium of the Health, Education, and Welfare Building, Washington, D. C., November 5 and 7, beginning at 9:30 a. m. The remainder of the conference will be devoted to executive sessions and committee meetings.

In Departmental Periodicals . . .

THE CHILD

Educational Films

Educational films on child life are used as a group device for stimulating discussion of family relationships, child development, and the principles of mental health. Dr. Esther E. Prevey reports in the May 1953 issue of *The Child* that such films have been popular in the family life education program of the Kansas City, Mo., public schools.

About 100 groups of parents meet regularly there with parent-education leaders. When parents analyze the fictional family problems they see on the screen, they can talk freely without revealing some of their own problems. To get the maximum help from a selected movie, skillful leadership is needed to encourage and channel the informal group discussion.

Group leaders in Kansas City are guided by a memorandum on the use of films when they direct group discussion. For planning future meetings, they also record helpful information on a film evaluation sheet.

Dr. Prevey mentions two film lists on sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C. These are: "Mental Health Motion Pictures" (National Institute of Mental Health, National Institutes of Health, Public Health Service, U. S. Department of Health, Education, and Welfare; 124 pp.; 30 cents); and "Motion Pictures on Child Life" (Children's Bureau, U. S. Department of Health, Education, and Welfare; 61 pp.; 40 cents).

Social Casework in Camp

Mrs. Adelaide Z. Palumbo suggests that the trend is apparent that workers in health, education, social work, and camping are teaming up in children's camps. Those who

have worked together in privately owned camps and in organizational camps—the group workers, caseworkers, nurses, psychiatrists, psychologists, and education and recreation specialists—have found that camping is an untapped natural resource for dealing with the "whole child" and his family relationships.

Camp staffs do not yet include social workers, either group workers or caseworkers, although a camp gives service to the child much as does a child guidance clinic, a casework agency, or a neighborhood center. But caseworkers have already had some experience in placing children in camps because family agencies, children's agencies, and health agencies have been sending children to camp for years. Opportunities are present, too, for social workers to work in some camps as counselors, supervisors of counselors, and camp-intake and followup workers.

The children's camp lies within the competence of social workers and offers additional practical experience to work with children, which would be difficult to gain elsewhere. Significant trends in this direction are evident from developments such as these: A recognized school of social work has offered its first course in camping; a vacation association has created the first fellowship for advanced study in social agency camping. Social workers who are planning to work with families and children in casework, group work, or psychiatric agencies would do well to investigate the opportunities for experience offered by those camps which are authorized to give accredited field experience to social work students.

The Child is issued 10 times a year by the Children's Bureau, U. S. Department of Health, Education, and Welfare. \$1.25 a year (\$1.50 foreign mailing), 15 cents a copy, from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Sex Differences in the Trend of Mortality From Certain Chronic Diseases

By GENE KAUFMAN and THEODORE D. WOOLSEY

Differences in the trends of mortality among men and women for cardiovascular-renal diseases, ulcer of the stomach or duodenum, diabetes mellitus, and hernia and intestinal obstruction are examined. A similarity between the pattern of trends for the various age-sex groups in ulcer death rates and in cardiovascular-renal death rates is noted, and the implications of this similarity are discussed.

IN ANALYZING the trend of mortality from the major cardiovascular-renal diseases during the period 1920 to 1947, Moriyama and Woolsey (1) found pronounced differences in the trends for men and women. There was a marked contrast in the direction of the trends for white men and women between ages 35 and 65. Death rates for the major cardiovascular-renal diseases increased considerably among white men in these ages, while the corresponding rates for women were declining.

Various hypotheses have been suggested to

Formerly associated with the Division of Public Health Methods, Public Health Service, as a biostatistician in 1951-52, Mr. Kaufman is now with the Office of the Comptroller of the Army, Department of the Army, Washington, D. C., as a statistician and program progress analyst.

Mr. Woolsey, a biostatistician in the morbidity and health statistics branch of the Division of Public Health Methods since 1947, specializes in survey methods for the measurement of illness in the general population. He has participated in studies of mortality for the Division of Public Health Methods and in the past for the National Office of Vital Statistics, Public Health Service.

explain this phenomenon. Some of these are: differential effects of changing dietary habits upon the two sexes; differential effects of worry and personal tensions; differential effects of exercise or lack of exercise; changing patterns of urban and rural residence; and differing effects on the aging generation of men and women, which when young passed through the stress of World War I and the influenza pandemic of 1918-19.

While the explanation cannot be finally determined without a great deal of careful investigation, some light may be thrown on the subject by looking for other causes of death which exhibit a disparity in trend between the two sexes similar to that found for the cardiovascular-renal diseases. For this reason, death rates by age and sex for ulcer of the stomach or duodenum, diabetes mellitus, and hernia and intestinal obstruction are presented here for the two 6-year periods, 1921-26 and 1942-47.

The selection of 2 of these 3 causes of death for investigation was made because of the association which is known to exist between death rates for these diseases and 2 factors which may have something to do with the observed trends for cardiovascular-renal mortality. If one factor, tension and worry, played an

important part in the trends seen in mortality from chronic diseases of the heart, arteries, and kidneys, a similar pattern with respect to sex differentials might reasonably be expected to show up in the mortality for ulcers. On the other hand, diabetes death rates are known to be related to overweight. Consequently, finding trends of diabetes mortality which exhibited a disparity between the sexes like that seen for the cardiovascular-renal diseases would slightly strengthen the argument for overweight as an explanation of the latter. It was recognized, however, that diabetes was not an ideal selection from this standpoint. The introduction of insulin, which began to affect diabetes mortality in the middle of the 1920's, and, also, certain procedures in the assignment of primary cause of death may have modified the influence of changing proportions of overweight persons on the diabetes death rates.

Death rates for hernia and intestinal obstruction are probably not entirely independent of either of the two factors: tension and worry; and overweight (2). However, there is good reason to believe that their influence on mortality from this cause is very much less than on the two other causes of death. Hence, hernia and intestinal obstruction was chosen as a control for the other two, although "control" is not used here in the strict experimental sense.

Description of Method

The rates shown are for white men and women, ages 25-84, in the Death Registration States of the United States. (A time-series of death rates for the "registration States" refers to statistics which in a particular year are based on all States in the registration area in that year.)

The average number of deaths for each of the 4 causes of death in 3-year periods from 1921-23 through 1945-47 was first computed. This was done separately for each age and sex group shown in the table. Death rates were then computed on the basis of the estimated population for the middle year of each 3-year period. Because the trends for the entire 27-year span were observed to be essentially linear, it was concluded that a comparison of rates in two 6-year periods at the beginning and end of the inter-

val would serve adequately for studying the changes between 1921 and 1947.

The death rates specific for age and sex in the two 3-year periods 1921-23 and 1924-26 were therefore combined to obtain an estimated rate for the 6-year period, 1921-26. In a like manner, estimated rates for the period 1942-47 were computed. The age-specific rates for men and women in these two periods were then compared by means of ratios, the rate for the later period having been divided by the corresponding rate for the earlier one.

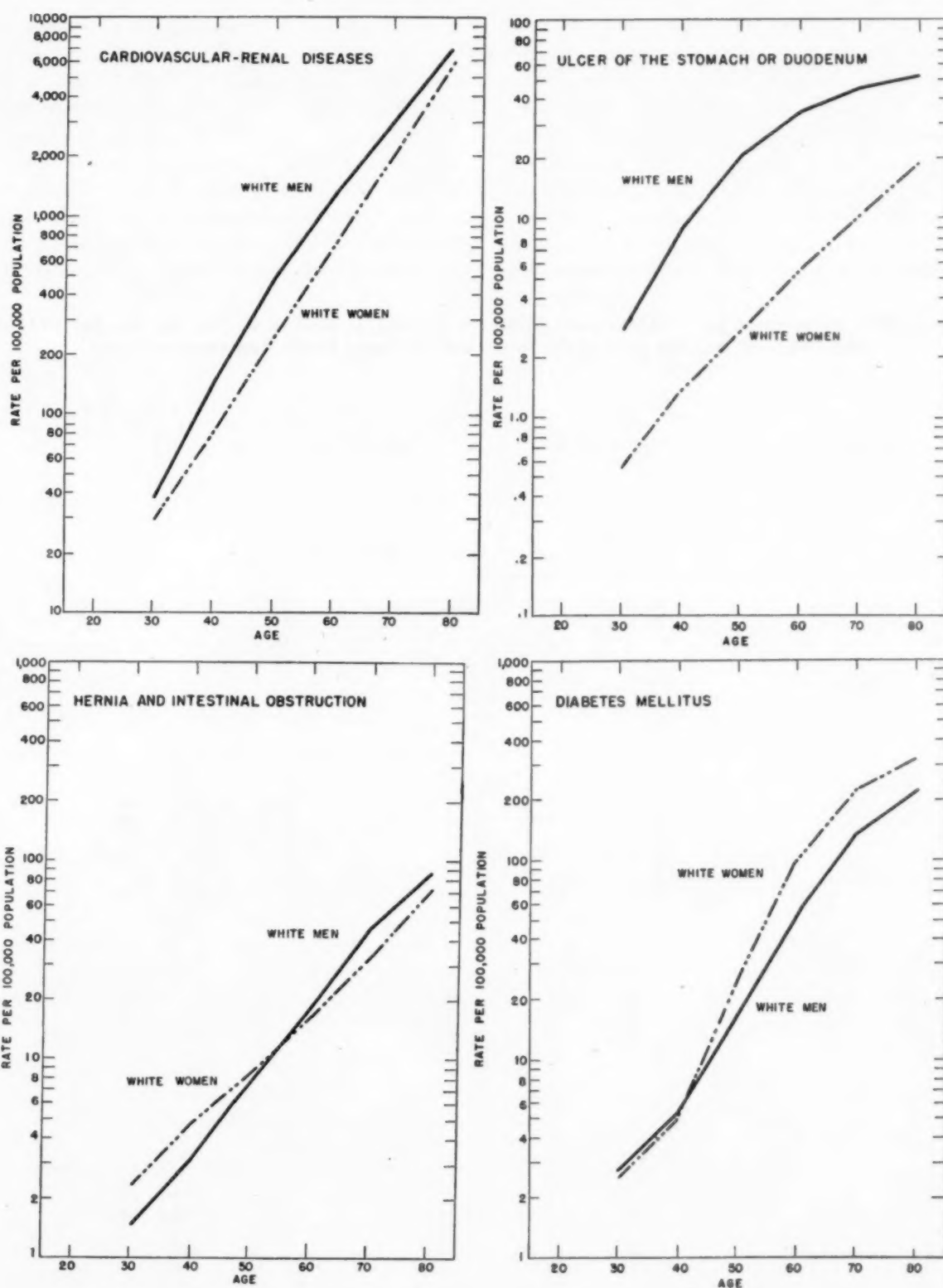
The study was restricted to the 27 years beginning with 1921 because the relative incompleteness of the death registration area prior to that time raises difficult questions concerning comparability of population groups. The death registration area did not actually cover the entire United States until 1933. However, by 1920 there were 34 States and the District of Columbia in the area which then contained 83.2 percent of the white population of the country. For a discussion of the effect of changes in the death registration area on trends of mortality for the cardiovascular-renal diseases, see reference 3.

Discussion

There are two disturbing influences that could alter the trends of mortality in the 27-year span, but neither one is believed to be capable of causing any serious distortion of the trends used in this study. One factor is the effect of changes in the number of States included in the death registration area. The other is the effect of periodic revisions of the International List of Causes of Death, which classifies mortality by cause. Increasing specificity in diagnosis and the improvement of medical knowledge of the nature of various diseases and their relationship to one another have made revision of the International List necessary.

However, the characteristics of the white population of the States in the death registration area from 1921 to 1933 differed only slightly from those of the entire country. Furthermore, the causes and groups of causes selected for examination were chosen because they were

Figure 1. Age-specific death rates for 4 diseases, 1942-47.



not seriously affected by the 1929 and 1938 revisions of the International List.

A more important consideration is the fact that the major emphasis here is on the comparison of trends for men and women. There is no reason to suppose that either of the above-mentioned factors would influence the trend for one sex in any way more or less than it would influence the trend for the other.

Age-specific death rates among white men and women for the major cardiovascular-renal diseases, ulcer of the stomach or duodenum, dia-

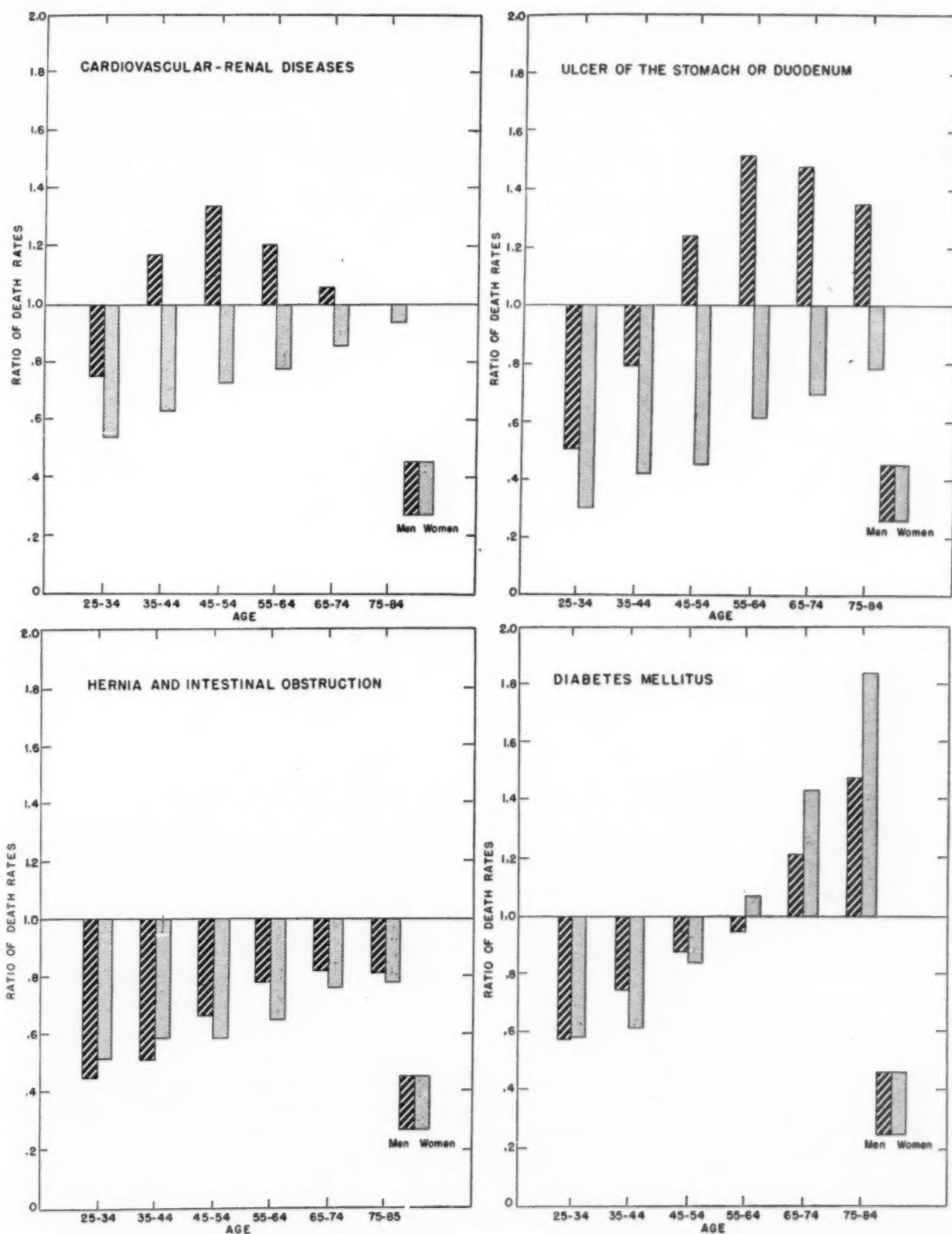
betes mellitus, and hernia and intestinal obstruction are shown in the table for the two 6-year periods, 1921-26 and 1942-47. The rates for the later period are also shown in figure 1 in which all four diseases are plotted on the same logarithmic scale to facilitate the comparison of relative differences between the sexes at the various ages. For each age and sex group, ratios of the 1942-47 rates to the corresponding 1921-26 rates are presented in the table and in figure 2. The same ratios are grouped by age in figure 3 so that the change in mortality for

Age-specific death rates per 100,000 population for 4 diseases among whites, by sex, for 1921-26 and 1942-47, and the ratio of the rates: United States Death Registration States

Age groups	Death rates				Ratio of rates 1942-47 to 1921-26	
	1921-26		1942-47			
	Men	Women	Men ¹	Women	Men ¹	Women
Cardiovascular-renal diseases						
25-34.....	48. 3	53. 6	36. 2 (41.4)	28. 9	0. 749 (0.857)	0. 539
35-44.....	123. 1	127. 7	143. 7	80. 4	1. 167	. 630
45-54.....	368. 4	340. 0	495. 2	248. 9	1. 344	. 732
55-64.....	1, 052. 9	894. 5	1, 271. 1	702. 1	1. 207	. 785
65-74.....	2, 855. 0	2, 512. 5	3, 033. 1	2, 167. 4	1. 062	. 863
75-84.....	6, 918. 6	6, 328. 9	6, 907. 8	5, 973. 6	. 998	. 944
Ulcer of the stomach or duodenum						
25-34.....	5. 43	1. 88	2. 73 (2. 90)	0. 56	0. 503 (0. 534)	0. 298
35-44.....	11. 26	3. 22	8. 90 (9. 03)	1. 35	. 790 (. 802)	. 419
45-54.....	16. 69	5. 97	20. 70	2. 71	1. 240	. 454
55-64.....	22. 67	8. 88	34. 45	5. 43	1. 520	. 611
65-74.....	30. 05	14. 82	44. 56	10. 24	1. 483	. 691
75-84.....	38. 20	24. 07	51. 58	18. 81	1. 350	. 781
Hernia and intestinal obstruction						
25-34.....	3. 23	4. 46	1. 45 (1. 55)	2. 30	0. 449 (0. 480)	0. 516
35-44.....	6. 06	8. 05	3. 11 (3. 15)	4. 72	. 513 (. 520)	. 586
45-54.....	11. 68	14. 57	7. 80	8. 57	. 668	. 588
55-64.....	23. 46	24. 91	18. 30	16. 23	. 780	. 652
65-74.....	49. 68	44. 64	40. 69	33. 99	. 819	. 761
75-84.....	105. 54	90. 92	85. 75	71. 03	. 812	. 781
Diabetes meliitus						
25-34.....	4. 73	4. 25	2. 72 (2. 90)	2. 47	0. 575 (0. 613)	0. 581
35-44.....	7. 00	7. 95	5. 20 (5. 28)	4. 87	. 743 (. 754)	. 613
45-54.....	18. 83	28. 92	16. 53	24. 36	. 878	. 842
55-64.....	55. 28	92. 36	52. 59	98. 92	. 951	1. 071
65-74.....	109. 25	159. 67	132. 81	229. 15	1. 216	1. 435
75-84.....	147. 67	170. 14	218. 69	313. 64	1. 481	1. 843

¹ Rates and ratios in parentheses are based on populations that do not include Armed Forces overseas.

Figure 2. Ratio of age-specific death rates in 1942-47 to corresponding 1921-26 rates, by disease.



the four disease groups among white men and women of a given age may be compared more easily.

It can be seen in figure 1 that the greatest relative excess in the male rate over the female rate for the cardiovascular-renal mortality occurs at ages 45-54. For ulcer of the stomach or duodenum, this maximum discrepancy occurs in the same age group. The largest relative discrepancy between the sexes for diabetes mellitus occurs after age 55, with women exhibiting the higher rate. It is apparent that the relative sex difference in mortality is very much greater for ulcer of stomach or duodenum than it is for the other three disease categories.

Age-Sex Patterns of Change

In both the cardiovascular-renal diseases and ulcers, the mortality among white women has been declining in the period studied, but the rate of this decline is consistently less with each succeeding age group from 25 to 85. Among men, there is a downward trend in mortality for both of these disease groups in the 25-34 age group. This downward trend changes to an upward trend in middle age, but beyond a certain age the rate of the increase declines. The greatest increase in the male cardiovascular-renal mortality is observed at ages 45-54, while at ages 75-84 there has been little or no change. In the ulcer mortality, however, the peak rate of increase among men is seen to be at ages 55-64. At later ages it decreases significantly, but the ratio of mortality in 1942-47 to that in 1921-26 does not drop back to 1.0 in the 75-84 age group as it does in the cardiovascular-renal group.

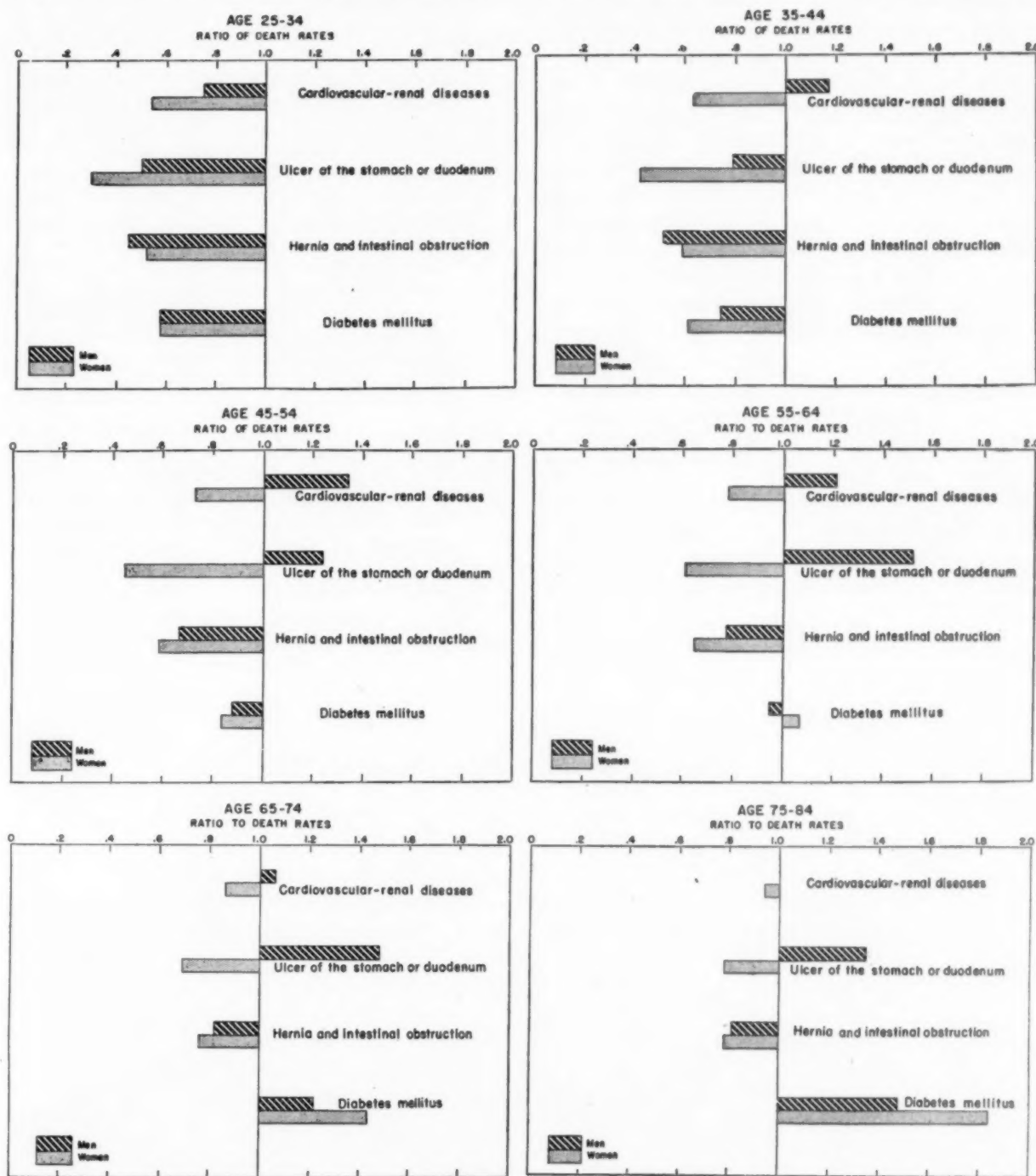
The pattern of change by sex and age for hernia and intestinal obstruction is quite different from that for the cardiovascular-renal diseases and ulcers. The pattern for diabetes is again different. Hernia mortality for both sexes has declined in all age groups although to a lesser extent in the older ages. With the exception of the first two age groups, 25-34 and 35-44, female mortality has decreased more rapidly than male mortality, but the difference between the trends for the sexes is very much less marked than in the cardiovascular-renal

diseases and in ulcers of the stomach or duodenum.

Diabetes mortality dropped about 40 percent in the 25-34-year age group during the 27-year span, but the picture with each succeeding age group appears less favorable. The mortality among the aged from diabetes is known to be heavily weighted with deaths of persons succumbing with the disease rather than from it. Although there has been an increase in the number of deaths from diabetes, the death rate of diabetic patients has definitely improved. As Dublin and Lotka point out (4), the probability of diabetes being diagnosed has greatly increased, and consequently, it is not at all surprising that the number of death certificates on which diabetes is mentioned has increased. Hence, the apparently unfavorable trend beyond age 65 is probably the result of the increasing life expectancy of diabetic patients. It is the sex differential in trend, rather than the trend itself with which this study is concerned, and here it is seen that after age 55 the trend for women is less favorable than that for men. Below age 55 the trend for men has been less favorable in 2 of the 3 age groups.

The pattern of change by age and sex for hernia and intestinal obstruction or for diabetes is not at all similar to that for the major cardiovascular-renal diseases. However, the similarity in the pattern of change for cardiovascular-renal and ulcer of the stomach or duodenum death rates is striking. This resemblance may be purely coincidental in the sense that the factors responsible for the changes in cardiovascular-renal mortality may be quite different from those producing the changes in the ulcer death rates. It is also possible that the same factors are responsible in both trends but that these factors have nothing to do with the etiology of the diseases. For example, there might have been an increasing opportunity for men to obtain a diagnosis of an ulcer or a heart condition—an opportunity which, for some reason or other, women were not getting. The evidence presented here by no means constitutes proof, nor does it even create a strong likelihood that tension and worry are the cause of the relatively unfavorable mortality among men of the later working ages.

Figure 3. Ratio of age-specific death rates in 1942-47 to corresponding 1921-26 rates, by age group.



However, this evidence should be taken into account in choosing the hypothesis for further investigation. More specifically, the similarity between the trends for cardiovascular-renal and ulcer mortality makes the investigation of the relationship between psychosomatic factors and

the cardiovascular-renal diseases a particularly promising possibility.

It must be emphasized once more that the differences between the rate of change in mortality for the sexes is of concern here rather than the magnitude of the rate of change itself.

Owing to the procedure employed until 1949 in assigning the primary cause of death for statistical purposes (5), the death rate did not always measure accurately the trend in the inherent risk of death from a given disease. This was particularly true of diabetes, since the former procedure for the selection of primary cause resulted in the assignment of many deaths to diabetes in cases in which this disease was listed by the physician as merely a contributory cause. An investigation conducted by the Metropolitan Life Insurance Co. in 1935 indicated that "53 percent of 3,519 deceased diabetic policyholders, for whom the facts were known, died from degenerative conditions of the heart, kidney, or arteries, 13 percent from infectious diseases, 4 percent from cancer, and 4 percent from tuberculosis" (4, p. 339). Yet, if diabetes had been mentioned on the death certificate in these cases, the death would have been classified as a "diabetes" death in the official death statistics for at least half of the cases. However, there is no obvious reason for supposing that

this factor would tend to operate differentially on the mortality for either sex.

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Closing of Two PHS Hospitals

Two Public Health Service hospitals—one at Cleveland and one at Fort Stanton, N. Mex.—are in the process of closing.

Closure of the Fort Stanton facility, a tuberculosis sanatorium, will be completed when its patients are transferred to other Service hospitals. Curtailment of operating funds for Service hospitals was the reason for the decision.

At Cleveland, the 190-bed general hospital has discontinued admissions. When its present patients, mostly veterans, have been discharged or transferred, an outpatient clinic will be established in downtown Cleveland. Emergency hospitalization for Service beneficiaries will be provided by contract arrangement at local hospitals.

Come-up Time Method Of Milk Pasteurization

By DENZEL J. HANKINSON, Ph.D., R. B. READ, M.S., WARREN LITSKY, Ph.D., and ROBERT R. BROWN, M.S.

CONVENTIONAL milk pasteurization treatment recognized by State and Federal statutes includes the vat method (143° F. for 30 minutes) and the high-temperature, short-time method (161° F. for 15 seconds). The high-temperature, short-time method has gained in popularity in the larger milk plants because of reduced space requirements and ease of application of regeneration (heat exchange from hot to cold milk). One disadvantage of the high-temperature, short-time method is the difficulty in accurately measuring and establishing the holding time at the short interval of a few seconds.

One solution to this difficulty is the elimination of the holding time, and hence the holding tube, by increasing the temperature to the point where only the "come-up" time will insure adequate pasteurization. This is the time required to heat milk to a given temperature. Studies at Cornell University in 1941 (1) indicated that this approach offers some possibilities.

In order that an adequate margin of safety may be established, standards should be based on a shorter come-up time than is possible with commercial milk heating equipment. Furthermore, since it is believed that any new definition of pasteurization should be based upon studies

with pathogenic bacteria, equipment that would permit such studies was designed. Basically, the equipment consists of a stainless steel pressure tank and small-bore stainless steel tubing. The tube is heated by high amperage, low voltage alternating current connected to the tubing at three or more points. This arrangement is illustrated schematically in the chart. Dimensions and operational data are as follows:

Capacity of pressure tank	5.0 gal.
Flow rate	5.75 to 11.5 gal. per hr.
Flow velocity	10 to 20 ft. per sec.
Reynolds number	3,500 to 7,000.
Air pressure required	30 to 120 lb. per sq. in.
Length of heating tube	2 to 10 ft.
Diameter of heating tube	0.065" i.d. × 0.125" o. d.
"Come-up" time, total	0.1 sec. to 1.0 sec.
Estimated time from final heating to collecting vessel (at 20 ft. per sec.)	0.025 sec.
Temperature rise, max	170° F.
Rate of heating	170° to 1,700° F. per sec.
Operating voltage (a. c.)	0 to 15.
Operating amperage	0 to 1,200.

Results of preliminary studies have indicated that phosphatase is destroyed and that there is a 100-percent kill of a 24-hour culture of *Escherichia coli* within the range of 176° to 185° F. at heating rates varying from 170° to 1,700° F. per second. Flavor observations on milk heated to 200° F. indicated quality at least comparable to high-temperature, short-time pasteurization. Studies on pathogenic bacteria will be initiated after satisfactory operating ranges are established with the phosphatase test and with heat-resistant test organisms.

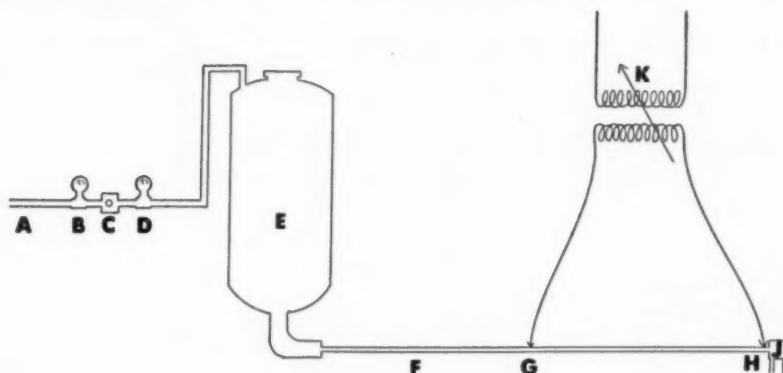
This method of heating in continuous flow, by which rates of flow and temperatures can be readily controlled, should permit the accumulation of reliable data on thermal destruction of enzymes, heat-resistant test organisms and, more important, on pathogenic bacteria, all of which are necessary before acceptance can be obtained for any process of importance to public health. Other applications could be found for the equipment in studying heating effects on fruit juices, wines, and other fluids in which controlled heating is required.

If these studies indicate that come-up time pasteurization is effective at temperatures less

Dr. Hankinson is with the department of dairy industry, Mr. Read and Dr. Litsky, the department of bacteriology and public health, and Mr. Brown, the department of electrical engineering, of the University of Massachusetts, Amherst, Mass. This investigation was supported by a research grant from the National Institutes of Health of the Public Health Service and is a contribution of the Massachusetts Agricultural Experiment Station.

Schematic diagram of laboratory apparatus for come-up time pasteurization

- A. Air line
- B. and D. Pressure gauges
- C. Pressure regulator
- E. Stainless steel milk container
- F. Stainless steel tubing
- G. and H. Adjustable connectors
- J. Dispensing apparatus
- K. Variable voltage transformer



than 200° F., it should be possible to apply the process with existing high-temperature, short-time equipment. The necessary alterations would be (a) elimination of the holding tube and (b) raising of the "cut-out" temperature for the flow diversion valve. The health inspector would no longer need to check both temper-

ature and holding time, only the pasteurizing temperature.

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Applications for Cancer Research Grants

Applications for new grants-in-aid for cancer research will be accepted before October 1, 1953, by the Committee on Growth, National Research Council. The grants will be effective July 1, 1954.

The Committee on Growth is acting for the American Cancer Society, which upon recommendation of the committee awarded approximately 250 grants totaling more than \$1.7 million during the past year. In addition to clinical investigations on cancer, the scope of the research program includes fundamental studies in the fields of cellular physiology, morphogenesis, genetics, virology, biochemistry, metabolism, nutrition, cytochemistry, physics, radiobiology, chemotherapy, endocrinology, and environmental cancer.

Investigators now receiving grants will be individually notified regarding renewal applications. Application forms and additional information may be obtained from the Executive Secretary, Committee on Growth, National Research Council, 2101 Constitution Avenue, Washington 25, D. C.

Public Health Today— The Nation's Best Investment

By LEONARD A. SCHEELE, M.D.

PUBLIC HEALTH is a human institution. Unlike eternal truths, it is not "the same" yesterday, today, and tomorrow. Instead, it is dynamic, subject to change, and constantly changing. Even as we meet here this morning, "today" is rushing to become time past; and "tomorrow," to become time present.

Public health cannot afford to be the same today as it was yesterday, or as it will be tomorrow. For while we are thinking about public health today—while the clock ticks away the next half hour:

Forty people in the United States will die from cardiovascular diseases.

In the same 30 minutes, another 12 will die from cancer.

Five more will die in accidents.

That is the toll which these causes alone exact every half hour today—and will exact every half hour tomorrow.

If these facts are at once dramatic and sobering, consider this: For more than 1,750,000 Americans, this half hour will be the same as the last, and the next, and all the rest this year. These are the people of all ages whose diseases, injuries, or impairments disable throughout time. To many of them, death is not as difficult to contemplate as the ticking of the clock into the hours and days of invalidism ahead.

The Surgeon General's presentation was part of a symposium on "public health yesterday, today, and tomorrow" at the 22d annual meeting of the Southern Branch, American Public Health Association, in Atlanta, Ga., April 23, 1953.

Spur to Action

A consciousness of needless death and suffering has always given public health workers a sense of urgency in their planning and daily operations. We have, however, lost—or are losing—some of that strong drive, for our very successes have eased the spur in many of our programs.

Plainly, it is more difficult to feel the urgency of diphtheria immunizations in school health work today than it was years ago when the first active immunizing agents were developed and diphtheria outbreaks were an ever present spur. In malaria control, it is more difficult to retain a strong motivation for tracking down a dozen or so indigenous cases in a wide, sparsely populated area than it was barely 5 years ago to conduct a vigorous DDT program in the many communities with high malaria rates.

Some of you may recall the plea of William James that society develop a "moral equivalent for war," in order that man may exercise his aggressive drives without destroying himself. To paraphrase that proposal: In our public health work, we need a psychological equivalent for epidemics. Without some such spur, we run the risk of ignoring the need for vigorous action against the major health problems of our times, and of sinking into desultory performance of our customary activities. The public, observing the apparent ease with which old threats to life and health are controlled and being insufficiently aware of present threats, can be excused for questioning the necessity of its substantial investment in public health.

The whole array of protective measures against communicable diseases is so woven into the average American's life that he takes the benefits for granted. Epidemiological investigations, sanitation, licensing of biological products, and quarantine, for example, operate day by day with very few citizens, relatively speaking, being aware of their influence. Even case-finding, immunization, and treatment activities reach directly only a small proportion of the total population. To many people, public health work seems rather dull routine.

In the perspective of time past, time present, and time future, however, public health measures have had spectacular results. The average length of life in this country has increased 5 years since 1940; 8 years since 1930; and 19 years since 1900. A population gaining in longevity and general well-being finds it easy to overlook the indispensability of public health work, even in fields nearly conquered. In the light of the Nation's health gains, however, public health is our best investment.

Economics of Public Health

According to the most recent estimates, there are between 35,000 and 40,000 public health workers in official health agencies in the United States. Of these, 28,000 are professional and technical personnel providing some type of full-time local health service to 70 percent of the total population in the continental United States, roughly 106,000,000 people.

Although the Nation's investment in public health and related services has increased since World War II, expenditures for the promotion of health and the prevention of disease and disability still comprise a small proportion of the total health and medical care expenditures. Public health budgets also are small in comparison with budgets for hospital and medical care.

The American public is spending about \$14 billion annually for all types of civilian health and medical services. Expenditures for the conservative services—prevention of disease, promotion of health, and medical rehabilitation of the disabled—amount to only 6 percent of the total. The total expenditure for the conservative services, from all sources, is thus well under \$1 billion annually.

The implications are clear. Unless the health conservation services are sustained, unless health research is sustained, hope must be abandoned for any substantial reduction of the enormous burden that hospital and medical care imposes on all people—often when it is too late to bring the individual health or even life.

Public health and related services are relatively inexpensive. Public health progress has been achieved, in fact, through consistent search for, and development of, relatively low-cost techniques.

It is not so much the low cost of public health as it is its enormous returns in human and economic values that makes it a profitable investment. The results, however, do not show up as rapidly or as discretely as do the profits from investment in new products, for public health is dealing primarily with the human organism in its varied environments. It may take a decade or more to evaluate the economic gain from some important forward move in public health. Hence, in assessing public health today, we have to look back to yesterday.

Costs and Savings

Indeed, it seems but yesterday in these southern States when the most conservative estimate placed the economic cost of malaria alone at half a billion dollars a year. The intensive DDT program which lifted this burden from the south cost about one tenth of a single year's economic loss. There are few citizens today who do not credit malaria control with its contribution to the great economic advance of the southern States in the past decade. The campaigns against hookworm and pellagra belong to an earlier period, but these public health investments also have played a major part in the economic progress of the south.

Reductions in deaths and disability due to tuberculosis and syphilis are saving untold millions in dollars and in days of productive work. At the same time, improved infant and child health is assuring that a larger proportion of Americans will become productive members of our society.

Control of industrial health hazards, developed from continuing research and applied in

many of the Nation's industrial establishments, protects the majority of workers in the United States from occupational diseases. Prevention of accidents in industry, through safety devices and education, has reduced dramatically the death rates due to industrial injuries. The savings in productivity and compensation costs as a result of health and safety services in industry are incalculable. Some large industries, for example, have reduced the man-days lost from nonoccupational illness by 50 percent, with a concurrent decrease in sickness, and accident payments of 35 percent.

Vocational rehabilitation programs, which include medical and hospital services when required, are returning more than 60,000 Americans to productive occupations annually, at a total cost of less than \$33 million. Before rehabilitation, the total annual earning of these people is about \$16 million. The first year after rehabilitation, their total income is \$116 million. A recent study shows that the cost of rehabilitating 376 families in West Virginia was less than the \$225,000 they had been receiving annually in public assistance. No longer dependent on public funds, these families are now earning about \$500,000 a year.

There are gaps in our current public health methods, it is true, but these gaps point up the tremendous importance of research. Since World War II, the United States has launched the most intensive medical research offensive in the history of our country or any other. This campaign is acquiring powerful momentum. The flow of findings predicted 5 years ago is now appearing. If continuity of medical research is maintained, substantial progress toward effective means of dealing with the chief killers and cripples of today is assured for tomorrow.

The potential gains to the Nation in better health for our people and in economic savings are stupendous. The investment required to maintain the current research effort and to extend it into unexplored fields, like the investment in public health and related services, is small when placed beside the Nation's expenditures for hospital and medical care, and still smaller when placed beside the costs of illness

and needless death in terms of lost productivity and dependency.

The Job Today

The investment in public health, though small in comparison with other expenditures, is substantial. Are we making the investment yield the best possible returns?

Many responsible health officials believe that we cannot answer that question without much more careful study of our programs and practices than is the general custom. Public health is a part of, and is influenced by, the great social and economic forces which operate in any dynamic civilization. It functions best when its leaders are alert to the changes occurring and when they take the initiative to keep public health practice responsible to the changing needs of the people.

We have a responsibility to see to it that the jobs given us to do are done with maximal efficiency; without needless duplication and expense, but with full attention to health needs. That is a large order in this day of rising prices and personnel shortages.

The major shifts in the causes of death and disability are familiar to all of us. The chronic diseases are becoming more and more significant as the population ages and the toll of acute infectious diseases is reduced.

Long-term disability due to chronic diseases is a heavy burden to the sufferer and a tremendous economic cost to the Nation. The chronicity and disabling effects of tuberculosis and syphilis have given public health workers striking evidence of this fact. Notable success against these two infectious diseases has been achieved during the past 10 or 15 years. However, tuberculosis deaths still cost the United States annually 1 million years of future working-life and \$350 million for hospital and medical care. Paresis in male patients alone costs an estimated annual loss of \$112 million in income.

In assessing our needs for personnel and funds, we must scrutinize our practices in every program and be prepared to concentrate our forces upon the most effective techniques. We must abandon techniques that careful evaluation studies reveal to be nonproductive. Many

public health practices which we have conceived as universally essential and universally applicable may have very limited value in dealing with the health problems of today as our social and physical environment changes. The basic skills of public health workers are, however, adaptable; what is wanted is the most effective utilization of those skills combined with the most effective utilization of the new instruments and agents flowing from scientific research and development.

Our past successes in public health have led many of us to believe that "more of the same" will accomplish results and that the public will continue to increase support on that basis. A popular song gives us the answer: "Taint necessarily so!" Our task today, therefore, is to learn quickly how to spend better the funds for which we are responsible, whether they are derived from Federal, State, or local taxes, or from public subscription and private donations.

Chronic Disease Prevention

At the present time, a major strategic goal of public health is to strike at the roots of chronic disease by preventive methods. Preventive knowledge and methods in the field of chronic disease are such, however, that the practicing physician and the hospital have the major share in achieving this strategic goal of public health.

A basic problem in public health today, therefore, is to devise means whereby the skills of the private physician, the public health staff, and the hospital may become increasingly united for the prevention of disease and its disabling effects, and the promotion of health.

Our public health experience in syphilis control has given us valuable guidelines as to what is needed to bring about such effective utilization of resources. Medical science has provided both efficient laboratory tests to detect infection and remarkably effective therapies that can be administered by the general practitioner in his office, as well as by the outpatient department. Public health has developed effective case-finding and followup procedures, as well as other supporting services valuable to the physician. As a result, we can expect a continued decline in syphilis if the united efforts of public health

department staffs and private physicians are not relaxed.

This victory was not won overnight. It has taken more than a quarter of a century of co-operative research, of trial and error, of patience and persistence to achieve the present hopeful position in syphilis control. Even now we cannot say that we have all the answers, that there will be no further scientific or administrative advances in syphilis control. But we have developed methods which other programs may profitably emulate or adapt.

We have made a beginning in tuberculosis control, also; but case finding and therapy in this field, useful as they have been, have not attained a demonstrated efficiency comparable with that in syphilis control. Other chronic disease control programs, such as heart disease and cancer, are still in experimental stages. Although there are a few promising developments here and there about the country, effective preventive programs in these fields await new findings in basic and applied research.

The Community and Public Health

Responsible citizens in every walk of life have an intellectual interest in medical research and an intellectual concern that its vital mission be accomplished. But it is the public health services in the local community that command the emotional interest and concern of every citizen. The adequacy or inadequacy of local public health services has an immediate impact on each family, each individual.

More than ever before in history, public health today is the product of the local community. Unquestionably, the pioneer movement to stimulate local initiative in the prevention of disease is the most significant contribution of the public health profession to the Nation's welfare. The pattern of local health service has been developed by the profession and sometimes has been offered to communities for adoption with relatively little consideration of the tremendous social changes in this country, and of the shifts in population, in patterns of community life, and in health problems.

During the past 5 years, the United States Congress, after careful study, has not accepted proposals for specific, increased Federal aid to

local health units. This fact should stimulate the public health profession to analyze critically the lag in the development of full-time local health units.

The Congress represents and is responsive to the will of the people in health matters, as in other matters. There has been no lack of congressional interest in public health, and there is no lack today. The factors which operate to retard the development of local health units are many and complex. Let us consider briefly a few of the principal influences.

Since the end of World War II, the Congress has been faced with enormous financial demands upon the Federal Government. Nationwide concern has mounted, and with it has come a demand for increased State and local responsibility and independence in many domestic enterprises, including public health. Parallel with the increase in national and personal income, as well as in prices and taxes, there has been a growth and extension of Federal grants-in-aid to the States. The present system of Federal aid to the States is complex and involves many fundamental questions of governmental functions and fiscal responsibility. It is indeed a major problem in Federal, State, and local administration.

Federal-State Relations

Recognizing the seriousness of the problem and the necessity for rational solutions, the President of the United States has proposed—and legislation has been introduced in Congress—to establish a temporary Commission on Governmental Functions and Fiscal Resources whose major responsibility would be to study and make recommendations to Congress on the entire field of Federal activities in aid to State and local governments. Under the proposed legislation, the commission would be composed of 25 members: 15 to be appointed by the President and 5 each by the Senate and the House of Representatives. The commission would be expected to submit its report and recommendations in March 1954.

In a message to Congress on this subject, President Eisenhower, commenting on the national problem of Federal-State relations, said: "To reallocate certain of these activities between

Federal and State Governments, including their local subdivisions, is in no sense to lessen our concern for the objectives of these programs. On the contrary, these programs can be made more effective instruments serving the security and welfare of our citizens."

This is a statement of policy to which every responsible public health worker will subscribe. We must not wait, however, until the proposed commission has made its recommendations. We must begin now our studies of how our programs can be made more effective. As long ago as 1945, the Public Health Service pointed out that a larger share of the costs of basic health services should be borne by State and local governments. In general, this has occurred; but the major increase in State and local health expenditures has been in the fields of hospital and medical care.

I would urge the physicians, the health officers, and the citizens of our towns, counties, and States to work toward providing more financial support for the worthwhile old and planned new programs. Everyone should understand that the total financial obligations of the Federal Government, the current effort to bring the Federal budget into balance and ultimately to lower taxes, may well make it necessary to reduce Federal grants-in-aid to the States for public health work. Such a reduction should not be reflected in lessened service. The elimination of unnecessary and low priority projects, increased State and local appropriations, and greater voluntary support should more than balance any loss of Federal grants.

The continuing role of the Public Health Service will be to help the States with studies and demonstrations, or pilot programs, and technical leadership. We should all remember this basic principle of our democracy: Initiative and major action are the province and responsibility of the citizens and the States, free from any Federal paternalism that might destroy initiative in the public interest. We can expect that the Commission on Governmental Functions and Fiscal Resources will provide official agencies with an agreed, proper base for future Federal-State relations and Federal financial grants in the health field.

State and Local Responsibility

There should be substantially increased State and local activities in public health services—prevention of disease, environmental health, promotion of family and individual health, and medical rehabilitation of the disabled. This philosophy was expressed by the Hoover Commission when it reported: "The health of the Nation demands maximum employment of present scientific knowledge to control disease, and of research to find new methods for the prevention of disease. . . . The Nation's future can best be protected by using every means to prevent disease, rather than by providing unlimited hospitalization to treat it."

Until more State governments and legislatures and more local communities have adopted this philosophy, until they become zealots in its application, we can expect little progress in the further development of local health services. Public health workers as salesmen must also critically evaluate the product they wish to sell, in terms of the specific health needs and resources of specific communities.

It would be difficult to say, for example, to what extent our public health practices have been influenced by the truly remarkable advances in the prevention and treatment of acute communicable diseases during the past decade. Are our demands for laboratory procedures and public health nursing services in this field realistic? Are we providing services, once valuable, but no longer necessary? Improved technology in food production, processing, and distribution also challenge many of our standard sanitation techniques devised to protect us in earlier days. In the meantime, many serious needs remain unserved. Yet, we frequently base our estimates of costs and personnel required for local health services on the standard techniques that were defined 20 or 30 years ago.

Program Appraisal

The shortage of professional personnel in all categories is still acute. This statement, I realize, is growing a little shopworn. Thousands of speakers have made it from hundreds of platforms since the beginning of World War II. If we are not careful, it can become a dangerous

sedative to lull our awareness that we are doing so little to meet the personnel needs.

Our public health economists are the first to tell us that the available criteria for measuring "shortages" of personnel are far from specific. At best, such measurements afford us only a means for detecting the uneven distribution of health personnel. We have not yet developed sufficient scientific data on the effectiveness of specific techniques or on the functions and the performance of the different categories of professional workers to permit a completely realistic appraisal of our needs.

A few significant studies have been completed in the fields of hospital nursing and dental care. Others are in progress on the utilization of physicians' time in office and hospital practice. These point inevitably to the conclusion that many of our difficulties in staffing could be overcome by more efficient utilization of personnel in "scarce" categories, by increased use of less scarce personnel in related professions, and by increased use of well-trained, nonprofessional personnel.

During the past year, the Public Health Service attempted to develop a study of the amount and kinds of nursing service required to meet the minimum needs of local health departments. We found that studying the needs of a single type of service is not enough. Nor is it enough to study the needs for other types of personnel. We must have broader studies, aimed at determining the types of organization that will be most effective in meeting the health needs of different types of communities. On this basis, staffing requirements can be assessed efficiently.

Many local health organizations as now constituted cannot cope with today's problems—with the chronic diseases and impairments, with the health needs of the aging, with the chemical environment, and similar problems of contemporary society. Newer programs have been initiated to deal with some of these problems, but they do not always fit into the traditional structure of local health organization.

If public health tomorrow is to be a more effective instrument for service to the community, we must be vitally concerned today with appraisal of our current programs and

practices. We must be vitally concerned that the methods we propose are adaptable to the needs of different types of communities. Local health organization is indispensable and it must be strengthened—if tomorrow's health is to eclipse that of today. But public health must learn new ways of organization as well as new operating techniques in order to develop the kind of local health service that will meet tomorrow's needs.

Conclusion

Public health today is a part of public health yesterday and of public health tomorrow. Yet, tomorrow public health workers of all categories will be facing many of the same routine tasks. There will be the usual backlog of work, with additional tasks arriving every hour. There will be the same problems of staffing and recruitment; the same questions, seemingly unanswerable, about how to do today's job without

enough people and money. There will be little time to step back and think.

Somehow we must find time for reflection. Public health today is in a period of transition: a period in which we may see a realignment of the sources of financial support and of the functions of many organizations engaged in public health and related services. Yet, this can be one of the healthiest periods in the history of organized public health services. For if the public health profession responds to the demands of today with full exercise of the scientific method in which we have been trained, rather than with emotional attachment to the tasks of the moment, we can vastly improve our operations; bring the influence of preventive medicine and environmental health to bear upon related services; and extend the tested techniques and skills of public health into many fields still awaiting cultivation. This task is at once the task of public health today—and tomorrow.

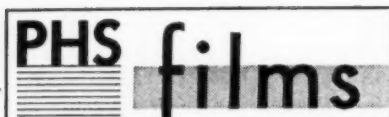
Public Health Service Staff Announcements

Elisabeth Boeker, Public Health Service nurse officer, is the first nurse to be sent to Iraq under the Point IV technical aid program. Miss Boeker will work with Iraqi nurses and other health aides to assist in developing public health nursing services in that country. She will advise the Iraqi Ministry of Health on nursing matters. In Basra she will help organize the nursing section of a new local health department and train public health nurses.

Margaret E. Benson has been appointed chief of infectious and tropical disease nursing of the Public Health Service Clinical Center at the National Institutes of Health. Miss Benson has served in various staff nursing and instructional capacities at the Minneapolis General Hospital

and the University of Minnesota School of Nursing. Since 1951 she has been special consultant to the Division of Nursing Resources, Bureau of Medical Services, Public Health Service.

Meral Loewus, a Public Health Service nurse officer, has been assigned to the Technical Cooperation Administration Mission to Iran where she will direct nursing education at the Nemazee Hospital of Nursing in Shiraz. The hospital, scheduled to open next year, is being built by the Iran Foundation, and the mission is helping provide staff members until their Iranian counterparts can take over. Miss Loewus will work with Iranian nurses in setting up the new school of nursing. Until recently, she was associate professor in the department of nursing at Montana State College.



Community

Fly Control Operations

16 mm., sound, black and white, 12 minutes, 1952.

Audience: Sanitarians, entomologists, public health personnel, and students engaged in or interested in community fly control.

Available: Loan—Public Health Service, Communicable Disease Center, 50 7th St. NE., Atlanta 5, Ga. Purchase—United World Films, Inc., 1445 Park Ave., New York 29, N. Y.

A successful fly control project as carried out in a typical town is shown in this film, designed to educate the residents of a community in fly control and to gain their support in the project.

The film presents a basic plan of attack that can be used to control flies in any community—education, sanitation, and chemical control.

These three measures are developed in the film by showing the procedures carried out by visiting State fly control specialists, local public health and municipal officials, and residents. The community is surveyed to estimate the number of flies present. The main fly breeding sites—exposed garbage, animal shelters and waste, industrial waste, and insanitary privies—are located. Residents are shown how they can aid in eliminating some of the fly breeding sites. Help is given city officials in solving the more expensive municipal problems of fly control.



Fly control supervisor carries education program to schools.



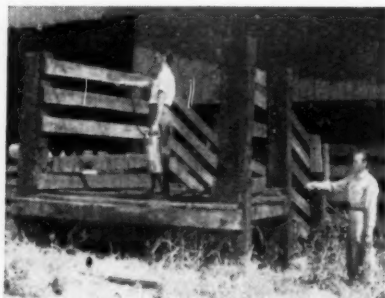
Community fly control supervisor advises mayor's committee on major municipal problem (open garbage dump).



Citizens' response to educational program—keeping animal waste in containers in privately owned animal shelters.

Insecticides are used for immediate relief and as a supplementary measure in the difficult problem areas, but basic sanitation is emphasized as a necessary factor in the permanent control of flies.

These measures, the film points out, will control fly problems but will never completely eliminate them. Routine vigilance must be continued indefinitely by making periodic fly counts, by keeping a check on possible breeding sites, and by using insecticides to combat occasional small outbreaks.



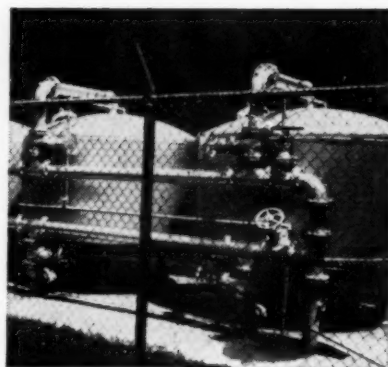
Fly problem site (stockyards) treated with residual spray.

Swimming Pool Sanitation

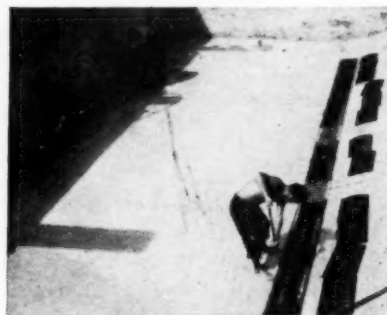
35 mm. filmstrip, sound, color, 8 minutes, 1952

Audience: State training officers, sanitarians, and others interested in desirable swimming pool characteristics and operational procedures.

Available: Loan—Public Health Service, Communicable Disease Center, 50 7th St., NE., Atlanta 5, Ga. Purchase—United World Films, Inc., 1445 Park Avenue, New York 29, N. Y.



Rapid gravity filters.



Cleaning pool.

This filmstrip shows some of the physical characteristics and the operating procedures basic to swimming pool sanitation.

Planning and construction: details size considerations, ratio of deep to shallow water area, overflow gutters, desirable provisions for recirculation type pools, units of the recirculation system, and several different filter methods.

Operation: includes provisions for operation such as dressing rooms, scheduling of sanitary operations, emergency preparations for breakdowns, and bathhouse maintenance.

Half a Century of International Control Of the Venereal Diseases

By THEODORE J. BAUER, M.D.

IN INTERNATIONAL negotiations to develop acceptable quarantine regulations, with which the international health movement was primarily occupied for many decades, venereal disease was of little importance. It was cholera and plague, smallpox, yellow fever, and typhus which engaged the principal attention of governments in their dealings with one another on health questions. Until after 1910, emphasis in international discussions of syphilis was often placed upon its social rather than its medical aspects, partly, perhaps, because of the poverty of preventive and therapeutic knowledge.

By the time the Health Organization of the League of Nations came into being, however, knowledge of the diagnosis and treatment of this disease had grown enormously. And as broader collaboration in health matters developed among nations, syphilis came to be recognized as a widespread and serious health problem. The Health Organization established an expert committee on syphilis, and from this group stemmed much of the useful work sponsored by the League in studying and standardizing certain venereal disease control procedures and techniques developed in the first decades of the 20th century.

In a somewhat different area, the International Union Against the Venereal Diseases also

began its work in the years just after World War I. At this time, many nations began campaigns and programs against venereal disease, employing varied methods and approaches. The International Union has attempted to foster these programs and to generate support for venereal disease control nationally and internationally.

Both of these organizations, the League and the International Union, participated in a movement to provide venereal disease control services for merchant seamen. The result of this movement was the Brussels Agreement of 1924, a landmark in international venereal disease control and still an effective instrument for providing venereal disease treatment facilities for seamen.

Since World War II, the keystone of international venereal disease control has been the venereal and treponemal disease program of the World Health Organization. The modern concept of international health efforts, that of assisting nations to improve health services and conditions internally, has been given broad application in the venereal disease program, which includes training of personnel, provision of demonstration teams, exchange of scientific knowledge, and mass application of antibiotic therapy in areas of high treponemal disease prevalence.

Antiquity of Syphilis

One of the classic controversies of medical history centers about the origin of syphilis: Whether it was brought to Europe from the New World at the close of the 15th century or existed there in antiquity. Whichever theory is correct, syphilis apparently was present in Europe

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at least by 1495. An epidemic of the disease in malignant form is usually said to have swept the continent at about that time, striking first in France, Spain, and Italy, and spreading quickly to Germany and Switzerland. Holland, Greece, and England knew it in 1496; Hungary and Russia in 1499. It is said to have ranged to the Far East early in the next century (1, 2).

Some writers believe that instead of a virulent syphilis racing across Europe after 1493, one or several infectious diseases, perhaps in combination with syphilis, were confused with and designated as the latter, thus giving rise to the "epidemic of syphilis" theory so often cited (3).

If the epidemic of about 1500 was indeed syphilis, the disease began to change within the following 50 years and has not since assumed the same violence and rapid fatality. Probably because it did not compare in virulence with such diseases as cholera and plague, syphilis did not figure prominently in later discussions of quarantine regulations designed to prevent the spread of disease from country to country (4-6).

Collaboration in Health

Nevertheless, in the 19th century particularly, debates and negotiations among nations on the subject of quarantine indirectly affected the development of international venereal disease control measures.

The 19th century was a time of progress in shipping and transport and consequently of growing trade and travel. Nations were drawn into closer and more diverse relationships, creating common problems calling for cooperative action. Yet, machinery through which national spokesmen could debate or act together on technical matters was lacking. In this situation, nations turned to the international conference. "When a problem became particularly acute," says Boudreau (7) of this period, "a government took upon itself the responsibility of calling an international conference . . ." The French Government called the First International Sanitary Conference in 1851, primarily to thrash out problems of quarantine and to seek unity in the prevention of cholera and plague. This conference represented the beginning of cooperation among nations in the field of health

and sanitation. In the next half-century, a score of conferences dealt with typhus, smallpox, and yellow fever as well as cholera and plague, and in 1907 the Office Internationale d'Hygiène Publique was established as a permanent international health office, concerned chiefly with enforcement and revision of the international sanitary conventions (6, 8, 9).

Once established, the principle of collaboration in health matters never died. Eventually, it was applied to the problem of venereal disease.

Approaches to VD Control

Before 1910, many countries confined their syphilis control efforts to regulation or repression of prostitution. Internationally, likewise, when venereal disease was discussed it was often closely identified with broad social issues rather than with health per se.

Yet, the importance of syphilis as an international health problem began to emerge at least toward the end of the 19th century. In 1899, an International Conference on the Prophylaxis of Syphilis was held at Brussels; in 1902, a second conference on the same subject, also held at Brussels, recommended among other things free treatment for all persons infected with venereal disease and distribution of leaflets emphasizing its dangers to persons entering the armed forces. Various groups, for example, the League of Red Cross Societies, the International Labour Office, and the International Union Against the Venereal Diseases, later held meetings which approached venereal disease as either a medical or a social problem or both.

The latter organization, the International Union, merits a special word as a voluntary organization with a continuous record of service. After World War I, many countries began campaigns against venereal disease; approaches and methods varied, however, and results were uneven. Speaking in 1928 of the disparity in modes of attacking the venereal disease problem, Professor A. Bayet of Brussels, first chairman of the International Union Against the Venereal Diseases, said (10): ". . . some countries . . . concentrate on the social effects . . .; others concentrate on individual treatment, aiming above all at the cure of the patient himself; others place their trust in laws and regulations, and others, without having any definite



Pan American Sanitary Bureau photograph

WHO photographs

(Left) Collecting blood samples in Itaugua, Paraguay, during anti-VD campaign, 1952. (Center) Centrifuging blood samples in the field (WHO Simla, India, VD Program, 1949). (Right) A nurse in one of the teams fighting endemic syphilis in Bosnia making a blood test.

programme, do what they can here and there without any unified plan."

This diversity in methods of attacking the venereal disease problem led to the foundation of the International Union Against the Venereal Diseases. At a series of conferences organized in 1921 by the League of Red Cross Societies to discuss venereal disease, the need became apparent for establishing a forum where varying viewpoints could be aired and a measure of uniformity sought in national approaches to venereal disease control. Founded in 1923, the International Union has sought since its earliest days to aid countries represented in its membership in developing sound principles of venereal disease control. This organization has also performed useful service in publicizing venereal disease control and in stimulating public support of control efforts (10).

League of Nations

With creation, following World War I, of the Health Organization of the League of Nations—with greater resources and broader functions than the Office Internationale d'Hygiène Publique—potentially effective machinery was established for a sustained global attack on health problems. The Health Organization began operating in a world where international health involved many questions other than quarantine. Among the problems faced by the young organization, for example, was that of standardizing many of the new "biologicals" and the procedures which advances in the medical sciences had produced (8).

Responsive to these new factors, the Health Organization of the League of Nations undertook early in its history to establish international standards for serums, biological products, and serologic reactions. Standardization was needed not only in performing serum tests for syphilis but also in interpreting and recording test results. The Health Organization of the League of Nations arranged conferences of experts in 1921, 1922, and 1923. The latter meeting and subsequent gatherings in 1928 and 1930 were working laboratory conferences, which evolved many valuable rules of serologic testing.

Standardization of antivenereal disease drugs was also part of the Health Organization's program, which embraced both arsenicals and penicillin. Provisional standards for the latter were established in 1944 (8).

Syphilis therapy also was studied. By the time the Health Organization came into being, arsenical treatment had gained wide acceptance among physicians. Various schemes and dosages were employed, however, and as Vonderlehr and Heller (11) have put it, "Almost every doctor who attained a scientific reputation in the treatment of the venereal diseases had his own plan for use of the arsphenamines." Beginning in 1928, through the agency of a Commission of Experts on Syphilis and Cognate Subjects, the Health Organization undertook an extensive inquiry into methods of treating syphilis with the arsenicals. More than 25,000 case records from clinics in Germany, Denmark, France, the United Kingdom, and the United States were analyzed. Results of the study, re-

ported in 1934, engendered widespread interest among health administrators and syphilologists.

The Brussels Agreement

The most specific accomplishment in international venereal disease control before World War II was the Brussels Agreement of 1924. The moving forces behind this convention, designed to provide venereal disease treatment facilities for merchant seamen, were the Health Organization of the League of Nations, the Office Internationale d'Hygiène Publique, the International Labour Office, and the International Union Against the Venereal Diseases. The agreement calls for maintenance of venereal disease treatment services for seamen and watermen in the ports of signatories. This occupational group, seamen and watermen, moving from port to port and particularly subject to exposure to venereal infection, had long been looked upon as an important factor in VD epidemiology.

The Brussels Agreement was an attempt to deal with this problem in a straightforward manner. Signed on December 1, 1924, by 1938 the convention was ratified or adhered to by 56 nations, dependencies, special ports, or island groups. In practical terms, its purposes have been effectuated somewhat more broadly than the number of its adherents would indicate. For example, the United States is not a signatory; but, after passage of the Venereal Disease Control Act of 1938, foreign seamen have been permitted to obtain treatment for venereal disease in clinics organized under the act, and the clinics themselves have been included in the International Treatment Center List provided for by the agreement (12, 13).

VD Control Before World War II

In a narrow sense, the record of international venereal disease control before World War II shows but few enterprises of substantial importance. Probably most valuable were the Brussels Agreement and the trailblazing done by the League of Nations in cooperative studies of syphilis serology and treatment. Beyond these specifics, however, lies the maturing of the whole concept of cooperative attacks on disease. In its modern form this concept involves the building up of an effective program

of health and disease control in each nation of the world. This approach was first demonstrated by the Rockefeller Foundation, which has worked effectively since 1913 toward developing cooperative action in the health field (14, 15).

To implement international cooperation as it applies to venereal infections, the early years of the 20th century produced the diagnostic and therapeutic processes which make possible the medical control of syphilis—demonstration of *Treponema pallidum*, development of the serologic test, use of the darkfield procedure in diagnosing early syphilis, and the enormous contribution of Ehrlich, salvarsan. There are, of course, a host of other factors—social, political, ethical, medical—which influence the international health movement. But those are far beyond the scope of this paper.

Principles for WHO Program

In the recommendations of the Interim Commission of the World Health Organization to the First World Health Assembly, held in Geneva in 1948, venereal disease control was among the programs assigned top priority. In selecting priorities, three principles guided the Commission (9): The worldwide or regional importance of the problem; the possibility of effective international action; the increased urgency of the problem as a result of war.

While there were no statistical guides by which the extent of the global venereal disease problem could be precisely assessed, data were adequate to establish the high prevalence of this group of infections and the aggravation of the problem as a result of the war. There was ample cause to believe that an international venereal disease program could be successful. Newly introduced methods of treatment, particularly penicillin, had removed many of the drawbacks of older forms of therapy; furthermore, the Interim Commission considered that, on the basis of past international experience in the field, renewed action against venereal disease was feasible. Thus, venereal disease control fitted well into the WHO plan of concentrating its initial efforts on "impact" programs. The First World Health Assembly accepted the priorities recommended by the Interim Commission, and authorized establish-

ment of expert committees in the priority areas (8).

WHO's venereal disease control program has been broadened since 1948 to encompass non-venereal treponematoses (yaws, pinta, bejel). At first, the Expert Committee on Venereal Disease, mindful of its terms of reference, had recommended against bringing bejel and related spirochetoses within the scope of WHO's venereal disease control program. Although the committee recognized that these diseases merited the attention of WHO, it felt that because of the "predominantly nonvenereal nature of these conditions" (16) they should constitute a separate activity of the world organization. Later, however, noting the "demonstrated uniform response of various treponematoses" to penicillin (13), and other technical and administrative considerations, the committee gave its approval to the broader program. The Second World Health Assembly (1949) decided that an expert group on treponematoses should be established under the program projected for 1950. Following the favorable attitude of the Expert Committee on Venereal Disease as to combining treponematoses (in addition to syphilis) with the venereal disease control program, the Executive Board of WHO approved the merger of the two expert groups. The enlarged committee held its first meeting under its broadened terms of reference in August 1952.

Criteria for Broadened Program

The content and accomplishments of WHO's venereal disease and treponematoses control program are described in WHO publications and elsewhere, and no attempt will be made here to analyze them in detail. However, because this program stands at the center of today's international attack upon venereal infections, a few of the chief premises on which the program functions will be summarized:

1. WHO's approach to venereal disease control is one of public health. At its first session, the expert committee (17), while recognizing the "vast social implications of venereal disease," suggested that WHO concentrate on the public health and medical aspects at least "until definite plans on . . . social aspects . . . now under consideration by the United Nations

and other international organizations become available."

2. One of the objectives of WHO's venereal disease control program is to help member countries establish and develop permanent control structures within national health administrations. Emphasis is placed on underdeveloped areas of high venereal disease prevalence.

3. Assistance in training venereal disease control personnel is supplied through fellowships and demonstration services and through support of training institutions in areas where facilities are limited. Demonstration teams and other phases of WHO's training program in venereal disease control are conceived as beginning points from which not only national venereal disease control programs but also broad public health programs can ultimately develop (13).

4. Efficient serologic testing for treponematoses is a prime requisite of an effective venereal disease control program. WHO's interest in serology is epitomized by the establishment of a Subcommittee on Serology and Laboratory Aspects (of the Expert Committee on Venereal Infections and Treponematoses) which is actively pursuing the ideal of worldwide standardization of serologic procedure, technique, and reporting of results in serum tests for treponematoses. Both the parent group and the subcommittee have emphasized the advantages of the cardiolipin and lecithin antigens in serologic testing. Through the cooperation of the Expert Committee on Biological Standardization, international reference preparations of these antigen components have been deposited with the Standards Department of the State Serum Institute, Copenhagen, and a standard description of them has been included in the International Pharmacopoeia. Several countries in Europe have begun to produce these substances, and there are plans for similar steps in Southeast Asia and in the Americas (in addition to the United States, where cardiolipin and lecithin antigens were first developed) (17, 18).

5. Penicillin therapy is in general use in WHO-sponsored programs of treponemal disease control. While the problem of penicillin production and distribution was separated from the venereal disease program by the First World Health Assembly, the expert committee has

watched the subject with great interest and concern. In fact, at its second session in 1948 the committee observed that in its opinion (16), "... the limited availability of penicillin [was] the outstanding restricting factor in venereal disease control in the world today." The economic commissions of the United Nations and WHO have worked together to stimulate production of penicillin, and the antibiotic is becoming somewhat more accessible for worldwide use. A Section on Antibiotics has been created within the WHO Secretariat, reflecting the importance with which this subject is viewed within the organization (13).

6. One of the great needs of the world in venereal disease control is the exchange of scientific information on venereal disease among professional workers. To aid in meeting this need, WHO has prepared a number of technical documents from data collected from many parts of the world. Another manner of meeting this need is through international meetings of experts and other workers. For example, in 1950, an International Symposium on Syphilis was held in Helsinki, Finland, through the cooperation with WHO of the Finnish and French health administrations. In March 1952, the First International Symposium on Yaws was held in Bangkok, in an effort to draw together the experience and thinking of professional workers on a disease which exists widely in Africa, Asia, certain of the Pacific Islands, and parts of the Americas.

7. The maritime aspects of venereal disease control have been studied by WHO from its earliest days. At its first session in 1948, the expert committee considered the view expressed by the Economic and Social Council of the United Nations that diplomatic conventions in technical fields should be replaced by health regulations adopted by the World Health Assembly. In 1949, at its third session the committee, having noted that delays are unavoidable in developing such regulations, pointed out the importance of the Brussels Agreement as the "sole practical instrument for venereal disease control between countries" (13, 17).

A particular segment of the maritime venereal disease problem has been attacked by the International Anti-Venereal Disease Commis-

sion of the Rhine. After discussion between WHO and the governments of Belgium, the Netherlands, France, Germany, and Switzerland, the Commission was established in 1951 to coordinate venereal disease services of these five nations for the benefit of the Rhine River boatmen and their families—a floating population of some 45,000 persons—and to establish diagnostic and treatment facilities in the principal ports of the river. An extension of the Commission's work is the Port Demonstration Project, established in Rotterdam to study venereal disease control among seafarers.

8. As units of a global structure, regional health organizations have been established to serve the needs of particular areas. The regional system of WHO was completed in 1951. There are today six regional offices covering Africa, the Americas, the Eastern Mediterranean, Europe, Southeast Asia, and the Western Pacific. The Regional Office of the Americas has been established in the Pan American Sanitary Bureau in Washington.

PASB and WHO Projects

Actually, the PASB has a far longer history in international health than WHO. The first health agency to function over a wide area for many governments, it antedates the Office Internationale d'Hygiène Publique by several years, having been formally organized by the Pan American Sanitary Conference in 1902. It functions today both as WHO's regional office and independently as the operating agency of the Pan American Sanitary Organization (8, 9).

A number of WHO-sponsored or -aided venereal disease control projects have been and are being conducted in the Americas. A yaws-eradication program in Haiti, for example, is being conducted under an agreement between PASB (as WHO's regional office), United Nations International Children's Emergency Fund, and the Haitian Government. Numerous South American countries have some kind of WHO-aided venereal disease control projects in progress, for example, demonstration and training projects in Ecuador and Paraguay, a training center in Venezuela, and laboratory training programs in Guatemala and Brazil.



WHO photographs

(Left) WHO public health educator calls a conference of social workers from Gabiah Province, Egypt, during a campaign against congenital syphilis. (Right) Director of Health at Sarajevo and leader of the Yugoslav-WHO-UNICEF antiepidemic syphilis campaign in Bosnia, examines boy's mouth for syphilitic lesions.

A number of other cooperative venereal disease control operations have been conducted in Mexico, Central America, and South America, through bilateral planning between the United States and other individual governments. And during World War II, the Inter-American Cooperative Health Program was initiated among the American Republics not only to provide medical and public health services for war workers but also to supplement and extend long-term disease control programs. Functioning through the Institute of Inter-American Affairs and the governments concerned, this program included VD control operations. At present, the Institute is co-operating with the Mexican Government and the Pan American Sanitary Bureau in a VD control program along the Mexico-United States border (19).

The PHS and the International Program

The Public Health Service entered the international venereal disease control picture through the League of Nations clinical studies

of syphilotherapy. Requested to participate in these studies, the Public Health Service undertook to assemble 10,000 case records from syphilis clinics in the United States, to analyze them, and to forward the records to the League for further analysis and comparison with data from other countries. Incidentally, at the time the League studies were begun, the Service decided to utilize the same sources of data in the United States for a more intensive investigation of the results of treatment of syphilis in this country. The participants in this inquiry—leading syphilis clinics—were the first members of the Cooperative Clinical Group, which developed some of the most comprehensive statistical and clinical studies of syphilis treatment on record.

The United States venereal disease control program, through its successful application of public health techniques to the venereal disease problem, has influenced the structure and content of WHO's antivenereal disease activities. In 1949, a seven-member Syphilis Study Commission of WHO toured venereal disease control

installations in this country (a) to evaluate methods in use in the United States and the importance of these methods in national and international programs, and (b) to study control methods, particularly penicillin treatment in syphilis. The Commission reported the organization and methods in the United States to be a helpful guide in planning future programs in other parts of the world, subject, of course, to adaptations to meet local conditions and problems.

Standardized laboratory procedures in the United States program and methods employed in compiling and analyzing statistical data were approved. Certain features of training and utilization of personnel were also viewed with favor, for example, special training in venereal disease control for medical officers assigned to this field, and performance by specially trained nurses, health educators, and investigators of a major part of epidemiological, educational, and technical work (20).

Undoubtedly, the experience in the United States with penicillin has hastened acceptance of this form of therapy in the international program. The WHO Syphilis Study Commission thought that the drug used in a control program is less important in diminishing the amount of venereal disease than the ready availability of treatment facilities plus an active case-finding program. Nevertheless, it recognized that the rapidity and nontoxicity of penicillin therapy makes this antibiotic of great value in syphilis control.

Results of WHO's Program

One of the most significant undertakings of WHO in treponemal disease control, in terms of permanent progress, is the training phase of the program. Personnel are being indoctrinated in essentials of public health practice which will serve both specialized treponemal disease campaigns and generalized health programs. For the private physician in contact with epidemiological and treatment demonstrations, there is opportunity to learn some of the attitudes and substance of preventive medicine—particularly important in areas where physicians receive little of these in their medical training.

Some valuable lessons in the methodology of mass attacks on disease are emerging. Clark (21) has pointed out the contribution to epidemiology made by the endemic syphilis program in Bosnia, Yugoslavia. Reynolds and Guthe (22) have summarized conclusions on case finding and treatment reached in WHO's early programs of mass penicillin therapy. These and other experiences indicate that in mass treatment programs a very high percentage of the population involved must be reached for examination if results are to be satisfactory. Experience in Haiti has given some excellent leads as to how this high level of coverage may be obtained. Where reliance is placed on voluntary clinic attendance, even when bolstered by a public appeal campaign, less than half the population will be reached. When, in addition, mobile clinics are used in strategic areas, the percentage rises to 70. Ninety-percent coverage in Haiti was achieved only when a house-to-house survey was employed.

Towering above all other results, real or potential, of international treponemal and venereal disease control is the prospect that the massive prevalence of these diseases may be cut down and possibly eradicated in large areas. Both in terms of humanitarian objectives and of economic improvement of the areas involved, this prospect has very broad ramifications indeed.

It has been pointed out that treatment alone has never eradicated a disease on a global scale; neither has vaccination nor environmental sanitation. But history abounds with instances of disease controlled by public health methods, and WHO's experience with mass treatment of venereal and treponemal disease encourages the belief that control and possibly eradication of these infections can be achieved.

This experience shows that infectiousness in treponematoses can be significantly reduced by mass use of penicillin in aluminum monostearate. In the Bosnia program, cases of secondary syphilis were found at the first control examination to be about 10 percent of the number found at the beginning of the campaign. At later examinations, this number was further reduced. While results are less spectacular in

other campaigns, significant reductions in infectious cases have occurred in programs in Haiti, Indonesia, Thailand, and Iraq. Up to January 1953, well over 9,000,000 persons had been examined and over 3,000,000 treated for treponemal disease in intensive campaigns sponsored by WHO and often substantially aided by UNICEF (22).

A single mass treatment campaign in an area is not sufficient to master permanently the venereal or treponemal disease problem in that area. Successful public health programs are usually protracted affairs. In treponemal and venereal disease, there must be a continuing effort to decrease the number of infectious cases, and resurveys are necessary to prevent recrudescence. Many factors—extent of the disease, completeness of case finding, opportunities for reintroduction—must be considered before the question of how many mass surveys can be answered for an area. Infectious cases must be brought down to the point where the local case-finding and treatment operation is adequate to deal with remaining pockets of infectious cases. Clearly, the more mature and complete the local public health organization, the earlier it can assume full responsibility for the local disease situation.

This fact helps to illuminate the wisdom of WHO's approach to venereal and treponemal disease control: to aid, to the extent of its resources, in the immediate diminution of disease in areas of greatest need, and at the same time to assist in building permanent public health structures especially through training of native personnel. This kind of attack, well supported and continuous, makes bright the hope that effective worldwide control of venereal and treponemal disease can be accomplished.

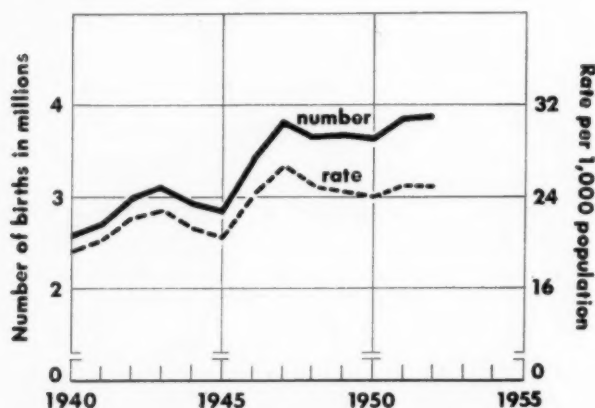
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U. S. Birth Statistics, January–April 1953

In April 1953 there were an estimated 292,000 live births. This is the first time in about a year that births were not higher than the corresponding monthly figure of the previous year. The birth rate on an annual basis for this April—22.5 per 1,000 population—was also somewhat lower than a year ago. In 1952, however, April births had been close to the all-time record for this month.

For the first 4 months of 1953, the total number of births remained high. During this period, births occurred at an annual rate of 24.4 per 1,000 population, and totaled an estimated 1,262,000. This is 23,000, or 2 percent, more than was estimated for the same period last year. These estimates allow for under-registration of births.



Estimated total live births and birth rates for the United States, 1940–50

NOTE: Data based on births adjusted for under-registration.

Since the end of World War II, more children have been born every year than in any wartime or prewar year. From an estimated 2,858,000 births in 1945 the total soared to 3,817,000 in 1947. After dropping to a slightly lower level for the next 3 years, the birth total reached a new high in 1951, and broke the rec-

ord again in 1952 with an estimated 3,889,000 live births.

Based on registered births alone, 58,000 more couples had a first child in 1951 than in 1950, according to preliminary estimates. This 5-percent increase in first-born children was largely a sequel to the marriage upswing that began in June 1950, at the start of the Korean War. Births of second-born children increased

Estimated total live births and registered live births, and birth rates in the United States, 1940–52, and January–April 1952 and 1953

[Data on total live births include estimates for unregistered births. Rates per 1,000 population]

Period	Estimated total live births		Registered live births	
	Number	Rate ¹	Number	Rate ¹
<i>Jan.–Apr.</i>				
1953 ²	1, 262, 000	24. 4	1, 243, 000	24. 0
1952 ²	1, 239, 000	24. 2	1, 218, 000	23. 8
<i>Entire year</i>				
1952 ²	3, 889, 000	25. 0	3, 824, 000	24. 6
1951 ²	3, 833, 000	25. 0	3, 758, 000	24. 5
1950	3, 632, 000	24. 1	3, 554, 149	23. 6
1949	3, 649, 000	24. 5	3, 559, 529	23. 9
1948	3, 637, 000	24. 9	3, 535, 068	24. 2
1947	3, 817, 000	26. 6	3, 699, 940	25. 8
1946	3, 411, 000	24. 1	3, 288, 672	23. 3
1945	2, 858, 000	20. 4	2, 735, 456	19. 5
1944	2, 939, 000	21. 2	2, 794, 800	20. 2
1943	3, 104, 000	22. 7	2, 934, 860	21. 5
1942	2, 989, 000	22. 2	2, 808, 996	20. 8
1941	2, 703, 000	20. 3	2, 513, 427	18. 8
1940	2, 559, 000	19. 4	2, 360, 399	17. 9

¹ All rates on an annual basis. For 1940 and 1950, rates based on enumerated population residing in the United States as of April 1; for 1941–46, based on estimated midyear population including Armed Forces overseas; for 1947–49, 1951, and 1952, based on estimated midyear population excluding Armed Forces overseas; for January–March 1952 and 1953 based on quarterly estimates of the population excluding Armed Forces overseas.

² Preliminary estimates.

moderately (2 percent over 1950), while increases in third and fourth births were more substantial—9 percent and 13 percent, respectively—continuing a steady rise that has been going on since the end of World War II.

Prepared by the National Office of Vital Statistics,
Public Health Service.

Incidence of Reactions To Antirabies Horse Serum

By THOMAS S. HOSTY, Ph.D.,
and FRANK R. HUNTER

THE REAWAKENING of interest in the development of hyperimmune rabies serum has made available a new approach to the prevention of rabies in man. Several groups of workers are now, or have been, exploring the use of serum as an adjunct to the classic vaccination procedure or possibly even as an outright replacement of vaccination (1-3).

During a recent outbreak of rabies in Birmingham, Ala., two children died from rabies, despite prompt and intensive vaccination with 14 Semple treatments. The incubation time was 17 days in one child and 19 in the other. Such short incubation periods allow very little time for the development of immunity. The Alabama State Department of Public Health laboratory in Birmingham, therefore, made available, first, hyperimmune antirabies rabbit serum and, later, a hyperimmune antirabies horse serum concentrate, to supplement vaccination.

This report deals with the use of the horse serum concentrate, which was provided by Lederle Laboratories with the request that the incidence of serum sickness following its use be assessed. The horse serum concentrate was used only on patients having face, neck, arm, and hand bites, the patients having been skin-tested before administration of the serum. Serum was not used if the bite occurred longer than 72 hours prior to the time serum could be given. The dosage was 0.25 ml. per pound of body weight given intramuscularly, followed in 24 hours with at least a 7-course treatment of Semple vaccine unless a shorter course was indicated by the condition of the biting dog.

Dr. Hosty is director of laboratories of the Alabama Department of Public Health. Mr. Hunter is director of the department's branch laboratory in Birmingham.

Serum Reactions

Reactions to antirabies horse serum concentrate in 32 patients are presented in the table. Eight of the patients had attacks of serum sickness of varying intensity. Only three of these reactions were severe and two were moderate. The latter two reactions were on a mother and daughter. If the three slight reactions are discounted, the reaction rate is 15.6 percent, a figure which compares favorably with reported reaction rates following the use of rabbit serum and is far less than reported rates following the use of sheep serum (3). If this reaction rate is maintained with more extensive experience, the use of antirabies horse serum in the presence of a negative skin test would not be contraindicated.

Ten of the patients were bitten by dogs proved rabid. The presence or absence of virus in the submaxillary glands of the dogs, however, was not determined except for patient 32. In this instance, rabies virus was demonstrated in an LD₅₀ titer of 10⁻⁴. Four additional patients were bitten by dogs in which rabies was doubtful. In one instance the biting dog was not found, and in two instances the animals were killed and the brains found negative for Negri bodies. In the latter two cases, no animal inoculation was done. In one other instance, Negri bodies were found by one laboratory but not by another. Animal inoculation in this case, however, was negative. Of the patients bitten by dogs proved rabid, 7 had face bites; 2, finger bites; and 1, leg bites. Of those bitten by doubtful rabid animals, 2 had face bites; and 2, finger bites.

Discussion

Experimentally the use of antirabies serum has a good foundation (2,3). One adverse report which has appeared is not based on recent experimental evidence (4). It is not possible, of course, to draw a definite conclusion as to the value of serum on the basis of this limited study. It is safe to say, however, that there are no serious contraindications to its use and that it may indeed have done some good.

In view of the fact that 7 patients with face or neck bites and 2 with finger bites from rabid

Data on 32 patients treated with hyperimmune rabies serum of horse extraction

Patient	Age (years)	Weight (pounds)	Location of bite	Nature of bite	Animal rabid	Number of days Semple vaccine given	Serum dosage (ml.)	Reaction
1.....	8	87	Face.....	Severe.....	No.....	9	20	None.
2.....	6	45	Legs.....	Mild.....	Yes.....	14	10	None.
3.....	6	46	Cheek, chin, and upper lip.	Moderate.....	Yes.....	14	10	None.
4.....	4	35	Finger.....	Mild.....	Yes.....	14	9	None.
5.....	3	28	Cheek.....	Mild.....	Yes.....	14	7	None.
6.....	4	40	Face and abdomen.....	Severe.....	Doubtful.....	14	10	None.
7.....	5	40	Face.....	Moderate.....	No.....	7	10	None.
8.....	4	42	Lip.....	Moderate.....	No.....	7	10	None.
9.....	6	50	Eyelid and scalp.....	Severe.....	No.....	0	20	None.
10.....	3	33	Lip.....	Mild.....	No.....	7	8	None.
11.....	4	37	Cheek.....	Mild.....	No.....	6	9	None.
12.....	9	50	Chin.....	Mild.....	No.....	7	12.5	None.
13.....	14	40	Forehead and scalp.....	Severe.....	No.....	7	10	None.
14.....	4	37	Cheek.....	Moderate.....	No.....	6	9	None.
15.....	5	39	Lips.....	Mild.....	No.....	7	9.75	None.
16.....	4	44	Forehead and eyelid.....	Severe.....	No.....	7	10	None.
17.....	16 (mo.)	40	Face.....	Mild.....	Yes.....	14	10	None.
18.....	4	41	Forehead.....	Mild.....	No.....	7	10	None.
19.....	6	43	Face.....	Severe.....	No.....	0	11	None.
20.....	3	30	Face.....	Moderate.....	No.....	7	10	None.
21.....	4	35	Cheek and lip.....	Severe.....	Yes.....	14	9	None.
22.....	3	30	Face.....	Severe.....	No.....	3	12	None.
23.....	13	80	Face.....	Severe.....	No.....	2	32	None.
24.....	8	60	Face.....	Severe.....	No.....	2	15	None.
25.....	28	160	Neck.....	Mild.....	Yes.....	14	40	Mild. ¹
26.....	8	60	Thumb.....	Moderate.....	Yes.....	14	15	Mild. ²
27.....	4	32	Lip.....	Mild.....	No.....	7	8	Mild. ³
28.....	31	128	Fingers.....	Moderate.....	Doubtful.....	14	32	Moderate. ⁴
29.....	8 (mo.)	20	Face.....	Mild.....	Doubtful.....	14	5	Moderate. ⁵
30.....	2	31	Forehead, eyelid, and leg.	Moderate.....	Yes.....	14	8	Severe. ⁶
31.....	26	134	Two fingers.....	Mild.....	Doubtful.....	14	33	Severe. ⁷
32 ^a	6	40	Nose.....	Mild.....	Yes.....	14	10	Severe. ⁸

¹ Slight urticaria 10 days later.² Slight rash at site of injection 11 days later.³ Slight redness and itching around injection area 8 days after, lasting 2 days.⁴ Rash 4 hours after injection. Rash reappeared after 5 days, lasting 5 days.⁵ Urticarial rash 5 days after injection, lasting 5 days.⁶ Fever, nausea, and vomiting fifth through ninth day.⁷ Severe urticarial reaction with swelling, fever, pain, nausea. Cleared in 11 days.⁸ Virus isolated from submaxillary gland of dog, LD₅₀ titer of 10⁻⁴.^a Rash and swelling after third day. Cleared in 5 days.

dogs were treated with a low potency vaccine, as measured by the Habel test, and that Sellers (5) has shown that the risk of infection is 72 times greater in face bites than in leg bites and 5 times greater in hand bites than in leg bites, it may be assumed that these patients were at great risk. Certainly patient 32 was exposed to infection because of the large amount of virus present in the submaxillary gland. None of the patients have to date developed rabies.

At present, it is premature to rely on serum treatment alone. If its use, however, permits a reduction in the number of vaccine treatments

from the usual 14 to perhaps 7 or less, this would in itself be a distinct advantage, since a shorter course of vaccine treatment should reduce the risk of postvaccination paralysis. Serum is also advantageous in cases in which the biting dog cannot be found immediately. Its use would allow time for a thorough search for the dog before vaccine treatment is initiated. When vaccine treatment is indicated only on the theory that any animal bite, no matter how trivial, can produce rabies, judicious use of serum might permit elimination of vaccination and at the same time offer the patient mental

relief. Finally, in the presence of severe face and hand bites, simultaneous use of serum and vaccine should materially reduce the danger of infection, if, in fact, the serum alone were not efficacious. The prolonging of the incubation period through the use of serum gives more time for active immunity to develop from the vaccine.

Conclusion

Further experience is needed to determine the value of antirabies serum. At present, however, it should be considered as another worthwhile tool in the prevention of rabies and should be used wherever indicated.

ACKNOWLEDGMENT

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Municipal Sewage Treatment Plant Construction

A total of 515 communities in the United States were awarded contracts in 1952 involving an expenditure of \$137 million for construction of municipal sewage treatment plants, according to a recent report released in May by the Public Health Service. Of these contracts, 314 were for new plants costing \$78,419,556; and 201, costing \$58,789,133, were for additions, enlargements, or replacements of existing plants.

The report compares the 1952 rate for this type of construction with the annual rate of from \$450 million to \$500 million estimated to be required over a 10-year period to bring the pollution caused by municipal wastes under reasonable control. The 1952 total of \$137 million is less than that for any year since 1948. It also falls short of the long-term average of \$141 million for the period 1915-50.

The report is available in the Division of Water Pollution Control, Bureau of State Services, Public Health Service, Department of Health, Education, and Welfare, Washington 25, D. C.

During the first quarter of 1953, \$31 million was invested by 119 municipalities for sewage treatment projects. Of these, 61 contracts were for construction of new sewage treatment plants; 48 were for enlargement or improvement of existing plants, and 10 were for construction of interceptor sewers.

In Departmental Periodicals . . .

OCCUPATIONAL HEALTH

Radiation Exposures

In the July (and final issue) of *Occupational Health*, Duncan A. Holaday summarizes the potential health problem from exposure to radiation. For many of the biological effects of radiation, there is a threshold dose below which no permanent damage will occur, he writes. For certain effects, such as the production of mutations, shortening of the life span, and possibly carcinogenesis, there is no lower threshold.

"Animal experiments and such data as we have on humans indicate that moderate radiation doses will increase the normal radiation rate," Mr. Holaday points out. For this particular effect, all radiation exposures are additive. "Calculations of radiation doses from various sources, such as the industrial and medical use of radiation, indicate that it is possible for an average person to be exposed to biologically significant amounts of radiation."

Mr. Holaday, an engineer with the Occupational Health Field Station of the Public Health Service at Salt Lake City, advises "all health departments to obtain data on the location of sources of radiation in their areas, on the levels of radioactivity in air and water, and on control and protective measures employed." Such baseline information, he concludes, would permit an intelligent appraisal of the extent of the present and future problems which the use of radiation may create and would permit the responsible agencies to determine their future course of action.

Other items in the July issue include articles on:

"Occurrence of Radon in Non-Uranium Mines in Colorado" (by P. W. Jacoe). The finding of appreciable quantities of radon in mines located several hundred miles from the nearest known deposit of uranium-bearing ore might indicate the possibility of undiscovered ore bodies nearby.

"Industrial Medicine Services in Italy" (by R. Vigliani). The number of industries in Italy which have their own medical services is increasing, although there is as yet no law compelling every industry to organize a medical service in its factories or establishing the rights, duties, or professional training of factory physicians.

"Occupational Health—A Joint Industry and Public Health Responsibility" (by Charles D. Yaffe). Industry in recent years has come more than halfway to meet the health agency in shouldering the responsibility for occupational health work.

"Occupation and Health" (by Seward E. Miller). Health hazards are reviewed in selected industries, such as chromate-producing, and in certain occupations, such as arc-welding in the steel shipbuilding industry.

Suspension Notice

Publication of *Occupational Health*, a monthly since 1940, has been suspended with its July 1953 issue as the result of reduction in appropriations. However, *Public Health Reports*—which in recent issues has presented papers on air pollution, human relations in industry, occupational and environmental aspects of various diseases, and industrial dentistry—will give increased attention to technical topics in occupational health. Official agencies, professional organizations, and teaching institutions not now receiving *Public Health Reports* should inquire of the Public Health Service as to their eligibility for official or free subscriptions. Other groups—and individuals wishing personal copies—should purchase subscriptions. *Use the subscription blank on the inside back cover of this issue.*

Recent issues of *Occupational Health* are available at 10¢ a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Elements of a Coordinated System Of Vital Records and Statistics

By HALBERT L. DUNN, M.D., Ph.D.

THE TEEN-AGER who needs a birth certificate to prove he is old enough to work and the demographer who needs global data to forecast world population are both served by the vital statistics system. Whether they are served well or badly depends on the functioning of a multitude of complex mechanisms—the local, State, Federal, and international units that make up the vital statistics system. These units collect and preserve vital records, perform essential services to the public in relation to the records, and produce the tabulated data that form the body of vital statistics.

Problems of Coordination

The most important problem facing the diverse mechanisms that make up a system of vital statistics is how to function as a coordinated whole. The individual units in the system may be likened to pieces of a mosaic. How can they be fitted together to form a complete picture, without blank spaces and overlapping? How can the methods and procedures of these

diverse units intermesh to produce a smooth-working, coordinated system?

“Coordination” is a much-abused word that should be defined at the outset. In this paper it does not mean the kind of coordination that implies a coordinator. The units that make up the vital statistics system are autonomous and will no doubt remain so. Any coordination that applies to these units must be the kind that develops through voluntary agreement on objectives, approaches, procedures, and the share of the total job that is appropriate to each.

The kind of coordination considered here is independent of organizational structure. It does not come by decree from above, and is not necessarily advanced by concentrating power in a centralized authority. For even though all record-collecting and statistical agencies might conceivably be centralized under a unified command, there would still have to be faced the original problem of coordination—of meshing the goals and procedures of statistics producers with those of statistics consumers, of relating the far-flung operations to the specialized needs of people outside the system for data on specific subject matter.

Agreement on Objectives

The problems of developing a coordinated system of vital records and statistics, therefore, should be approached primarily in terms of getting voluntary agreement by all the component units. What are the common objectives? Does each unit visualize the vital statistics system as a whole, not just as a miscellaneous mixture of little parts? In terms of the system as

Dr. Dunn is chief of the National Office of Vital Statistics, Public Health Service, and has been in charge of this unit, which was originally in the Bureau of the Census, since 1935. For the 12 years ended June 1952 he was secretary-general of the Inter American Statistical Institute and is now consultant to its executive committee. This paper was presented before the annual meeting of the American Statistical Association at Chicago, Ill., on December 27, 1952.

a whole, does each unit know where its own job begins and where that of the others leaves off? Are the right organizational pieces in the right places? In sharing the total job, have gaps been left?

Coordination is not a single problem. To obtain a fully complementary system of vital records and vital statistics, at least four distinct problems must be solved.

First, there is the matter of developing a proper working relationship among the various agencies producing vital records and vital statistics at each level of government—local, State, national, and international. We might call this intralevel or horizontal coordination. Much concern has been expressed, for example, about State and Federal governments in which various units allegedly publish noncomparable, unnecessary, or overlapping data that fail to meet much of the data needs of consumers. Criticism of this type in other fields of statistics led to the creation of the division of statistical standards in the U. S. Bureau of the Budget and to various other recommendations by commissions and other investigating bodies.

The second problem is to coordinate the objectives and practices of the local, State, national, and international vital statistics agencies. This interlevel coordination is of particular importance since vital statistics are produced in a vertical, step-up process, in which records or data move straight up from the smallest geographic divisions to the largest. For example, good vital statistics at the State level depend on records produced in local subdivisions; good national vital statistics depend on comparable material from 57 independent registration areas, and so on. Because of the massive vital record problem in this country, much work and effort have been directed toward vertical coordination, and considerable progress has been made in developing uniform standards, definitions, certificate forms, tabulations, and other procedures.

Orientation to Subject

The third problem is orientation of vital statistics to the broad variety of subject matter which they help to illuminate. Intersubject coordination is concerned with the use of vital statistics in relation to other data on the social, health, economic, geographic, and other char-

acteristics of populations. Special studies would give the answers to most of the problems in this area, and certainly the vital statistics system, operating at all levels of government, has the potential resources to conduct studies along many fronts. What studies are most needed? Which particular office is in the best position to carry it out? How can the study be so planned and conducted that its results will be applicable not only to the office that made it but to all other offices and agencies with similar problems? Certain types of studies are more appropriately made at the national level. A conspicuous example is a national health survey, machinery for which might be developed as a means of obtaining morbidity data from the general population to serve a variety of health needs. The skills incorporated in such a mechanism could be made available, upon request, to State agencies and nonofficial health organizations.

The fourth problem has to do with the coordination of various data that relate to the same individual, regardless of where these records were originally created and placed on file, so that the major events in his life may be linked and related to one another. Of necessity, such records are filed, if at all, where the event occurred, so that if he moves around much, his records may be scattered all over the United States and even in foreign countries. One office has his birth certificate, another his marriage license, while still others have his military, social security, and work records. His clinical records are scattered among the files of all the hospitals and physicians that have ever treated him. To pull copies of these records together, for the individual's own use, or for health control purposes, or for longitudinal studies, has become extremely difficult. Because of the political implications of attaching an identity number to the individual, and because of the substantial technical problems involved as well as differences of opinion as to the utility of such records, little is being done along this line.

Basic Terms Defined

It might be well to define our basic terms before discussing the elements that make for coordination:

"A coordinated system of vital records and

statistics" involves agencies at all levels of government that are responsible for the registration, collection, processing, and interrelation of vital records and the production of vital statistics derived from them. It includes mechanisms for improving methodology, for promoting internal consistency, efficiency, and economy, and for broadening the usefulness of vital records and statistics.

"Vital records" are certificates of death, fetal death, birth, legitimation, legal change of name, marriage, annulment of marriage, divorce, immigration, and naturalization.

"Vital statistics" are the statistical by-products of vital records.

"Related statistics" include population and morbidity statistics.

Immigration and naturalization records are included in the definition of vital records because they are recorded in much the same way and are used for similar purposes, even though historically they have not been handled by the same branch of government that handles other vital records.

Many other public records on individuals are officially collected and maintained—such as those of military service, social security, and professional licensing. As circumstances warrant, these might be considered for possible coordination with vital records.

It will be noted that morbidity statistics are classed as related statistics rather than as vital statistics. By historical accident both morbidity and vital statistics are often produced by the same government agencies, but their fundamental nature is quite different. Morbidity statistics are, of course, closely linked to vital statistics by a common classification for sickness and cause of death. But the legal and personal uses of morbidity records are extremely limited—most people, in fact, never see their own sickness records. Even though morbidity statistics may be part of the workload of a vital statistics agency, they are not an intrinsic part of the vital statistics system.

Elements of a Coordinated System

The importance of vertical coordination has already been mentioned, and the accompanying table is a first attempt toward mapping a distribution of the responsibilities of the several levels

of government with respect to vital statistics. In presenting my personal viewpoint as to where the primary responsibilities lie, it is not my intention to suggest a limitation of activity or functions of any of the units. Certainly there is room for constructive thinking on each of the elements at all levels of government.

Each person operating in a vital statistics office—whether at the local, State, national, or international level—tends to think of his own particular problems as discrete in nature, and his own office as a sovereign body. The time has come, however, when it is necessary for all those who hold responsible positions in units of the system to reexamine what they are doing with reference to the system as a whole in terms of the impact on the users of the records and of the resultant statistics. Perhaps the great advances of the future will come largely from a better concept of the system as a whole and a realization of the true functions, responsibilities, and potentialities of its parts.

In a dynamic field like vital records and vital statistics, which must continue to change in response to the needs of an ever-changing world, it will never be practical to set final goals. The 10 elements described below and summarized in the table are not to be regarded as final goals. They are proposed rather as basic components of the "next stage" in developing a coordinated system of vital records and vital statistics.

Completeness, Accuracy, Timeliness

The first element is completeness, accuracy, and timeliness in the registration of vital events. Behind these words is a never-ending struggle to obtain and secure the active cooperation of several hundred thousand official and semipublic personages who fill out certificates—physicians, hospital personnel, midwives, coroners, funeral directors, and others. To get in this country a reliable statement of the cause of death, for example, requires the understanding and cooperation of some 210,000 practicing physicians, who need instruction and reinstruction with every revision of the International Classification of Diseases, Injuries, and Causes of Death. To achieve satisfactory birth registration in two-thirds of the States has taken a full half-century of patient effort with physicians and

Elements of a Coordinated System of Vital Records and Statistics

ELEMENTS	Local responsibility	State responsibility ¹
1. Completeness, accuracy, and timeliness of vital records (except immigration and naturalization).	Primary responsibility for accurate and timely collection.	Primary responsibility for developing and maintaining State and local procedures in collection, and for consultation.
2. Preservation and protection of vital records, and service to the public.	Participation with State vital statistics office.	Primary responsibility for methods used, results obtained, and services rendered.
3. Focus of coordination: Definitions, classifications, laws, certificate forms, interstate and international procedures, and consistency control of vital statistics.	Participation with State vital statistics office and application of approved methodology.	Participation with NOVS in development of standards; primary responsibility for the application of methods and for consistency within the State.
4. Training and education of personnel.	Training programs for local purposes.	Inservice training of State and local personnel; participation in national training programs and academic training.
5. Vital records of American citizens abroad and of naturalized citizens at home and abroad.	Collaboration with State programs.	Collaboration with national agencies; and representation of local use requirements in national programs.
6. Annual and cyclic vital statistics (including life tables).	Production of local statistics; collaboration with State programs.	Primary responsibility for production of State and local vital statistics, including methodological research.
7. Special studies via vital and social statistics.	Local studies.	Planning and execution of State and local studies.
8. Population statistics and population estimates.	Participation with State on methods of research and collection of data.	Participation with Bureau of the Census and NOVS on methods research and collection of data.
9. Morbidity statistics, including morbidity reporting and health surveys.	Administrative responsibility for local morbidity reporting and local health surveys.	Primary responsibility for morbidity reporting and health surveys. Participation with Public Health Service on methods of research and development of standards and procedures.
10. A national vital statistics index (when and if established by law).	Participation with State vital statistics office.	Participation with Federal agency in developing standards and methods for establishing, and primary responsibility for implementing State portions.

¹ Includes Territories and independent registration cities (New York City; Boston; Washington, D. C.; Baltimore; and New Orleans).

midwives, as well as continuous education of the general public. The battle in the remaining States should be won within the next decade.

The drive toward complete and accurate registration was given a decisive impetus early in World War II, when defense plants and public agencies of all kinds insisted on proof of citizenship and other pertinent facts. As a re-

sult, State and local offices were swamped with demands to produce certified copies of records. This led to two permanent gains—a new public awareness of the value of complete and accurate registration, and more efficient procedures in State and local offices to cope with the increased public dependency on vital records.

Registration is primarily a local responsi-

and the Locus of Responsibilities for These Elements

National responsibility	International responsibility	ELEMENTS
Conduct of special studies aimed at improving methods, consultation service on request.	Establishment of general principles to meet international needs.	1. Completeness, accuracy and timeliness of vital records (except immigration and naturalization).
Conduct of methods research, maintenance of exchange of information, and consultation.	Establishment of general principles to meet international needs.	2. Preservation and protection of vital records, and service to the public.
In collaboration with States, primary responsibility for standards and practices.	Primary responsibility for international coordination of practices.	3. Focus of coordination: Definitions, classifications, laws, certificate forms, interstate and international procedures and consistency control of vital statistics.
Establishment of training programs and centers, participation in international programs and collaboration with schools of public health.	Establishment of training programs and related activities.	4. Training and education of personnel.
Establishment of a Federal focus for vital records involving, among others, the Immigration and Naturalization Service, State Department, and NOVS.	Responsibility for the coordination of vital record practices between nations.	5. Vital records of American citizens abroad and of naturalized citizens at home and abroad.
Primary responsibility for production of national vital statistics, including methodological research.	International statistical publications and exchange of information on statistical methods between nations.	6. Annual and cyclic vital statistics (including life tables).
Responsibility for developing special studies of national significance and collaboration with States.	Responsibility for special studies of international significance.	7. Special studies via vital and social statistics.
Production of population data a primary responsibility of Bureau of the Census. Small area estimates should be produced in collaboration with NOVS and States.	Promotion of national censuses having the degree of consistency essential for international needs.	8. Population statistics and population estimates.
Primary responsibility for national public health surveys and national morbidity reporting standards, in collaboration with State health departments.	Promotion and implementation of a worldwide morbidity reporting mechanism and promotion of national health survey mechanisms.	9. Morbidity statistics, including morbidity reporting and health surveys.
Primary responsibility for developing standards and methods to be used, and maintenance of consistency control in its operation.	Responsibility for developing and promoting standards and methods to be used consistent with international needs.	10. A national vital statistics index (when and if established by law).

bility. A late State registrar put this point most aptly: "The local registrar knows the new baby of the Jones family as Johnny Jones; the State registrar knows him as a certificate and a number; and the National Office [of Vital Statistics] knows him as a statistic." Only at the local level do vital records reflect real people, living in real places. If the record is to be complete, the local registrar must be on the job. If

hospital, physician, funeral director, or midwife fails to fulfill responsibilities, it is the local registrar who, with tolerance and patience, must explain, persuade, and follow up until the person mends his ways.

This is a difficult and important task, carried out by part-time workers usually paid on a "per certificate" basis. It takes understanding on the part of the local registrar, and considerable

devotion to a cause. This does not come of its own accord. To develop such a group of local registrars is a prime responsibility of the State vital statistics office. It means carefully prepared manuals of instruction for the local registrar. It means field visits by the staff of the State office and consultation between them and the local registrar. It means occasional conferences of local registrars and formalized periods of instruction. But most of all, it means the creation of an awareness of the importance of the task. Everyone does a job better when he knows why it is important and how it fits into a larger pattern of services.

Preservation and Protection of Records

Preservation and protection of vital records and service to the public have long been a major responsibility of the State registrar. Huge concrete and steel vaults are located in almost every State to house the precious documents and to protect them from fire and flood. Toughness of paper, durability of ink, and protection against mildew and mold are matters of constant concern.

Protection of records also involves safeguarding them against alteration or theft. In the old days when practices were looser, it was not unknown for a person who was permitted to search the bound volumes of certificates to rip out and carry away one of these important documents. Imagine the temptation it would be to a souvenir collector if the birth certificate of one of our American Presidents were under his itching fingers, with no one watching!

Unwarranted disclosure of facts on certificates might embarrass or damage individuals. The registrar must therefore restrict access to records to persons who can demonstrate "a direct, tangible, and legitimate interest" in the specific record. At the same time he must minimize red tape in providing certifications to those who do have such an interest. It may be assumed that everyone wants ready access to his own record or to a certified copy, so that he may present it to the various public and private agencies that require it as a condition of employment, old age pensions, and other benefits. At the same time he may want the record withheld from individuals or agencies such as the press,

the courts, and law enforcement agencies. The framing of laws and regulations that will protect the confidentiality of the record and at the same time keep it accessible to those with a legitimate interest in it is one of the knottiest problems in the registration field. Whether a common ground can be found on which the many conflicting interests can meet is now being explored by the American Association of Registration Executives, the organization of State registrars.

Focus of Coordination

The third essential element is a focus of coordination, including definitions, classifications, model laws, certificate forms, interstate and international procedures, and control of consistency of national vital statistics.

The coordination of vital records and the maintenance of satisfactory consistency in the national vital statistics are responsibilities which must be focalized in a single national agency having the authority and means to implement them. Prior to 1946 the national focus was the Bureau of the Census, which served mostly as a statistical focus. In that year, when the Congress transferred the national vital statistics activity to the Public Health Service—in line with the fact that State and local jurisdiction of vital statistics resides in health agencies—the policy was made clear that the Federal agency should also serve as a focal point in resolving difficulties and inconsistencies in registration practices.

After years of trial and error, the National Office of Vital Statistics came to the realization that the way to serve as a focus of coordination is to engage in cooperative agreements resulting from joint planning. The answer to the need for a national focus of coordination has emerged through the development of the Public Health Conference on Records and Statistics. The conference is a permanent organization, recognized by the Association of State and Territorial Health Officers as a body competent to deal with problems in the field of vital and health statistics. It is supported jointly by the States and the Federal Government, with a secretariat furnished by the National Office of Vital Statistics. Its decisions are its own and are entered into by

agreement, after opportunity for free discussion has made joint planning a reality.

In large measure the promotion of agreement on procedures and related matters is the responsibility of the national focal point of coordination. But it is interesting to realize that a similar mechanism for coordination on a world-wide scale is now emerging through the action of the World Health Organization, which has urged all nations to set up national committees on vital and health statistics. The establishment of such committees in many nations of the world, with the aim of bringing about direct participation by national technicians in the technical problems of an international nature, has launched yet another mechanism to promote better coordination. The first international conference of national committees on vital and health statistics has been scheduled for the fall of 1953.

All these recent developments lay heavy emphasis on participation and consent of all parties concerned, for the coordinating responsibility should not be exercised arbitrarily or unnecessarily. In essence, this means that each higher level of responsibility and authority should justify the need for introducing uniformity into a particular procedure before this right is surrendered by the technicians who operate closer to the people concerned. Unless this precaution is observed, the system as a whole will lose its flexibility and adaptability. Complete uniformity in all vital record and vital statistics activities is neither necessary nor desirable. Custom-tailoring in basic patterns, with flexibility to adapt the procedures community by community to fit special circumstances, is often the only way to meet registration problems.

At the same time the National Office of Vital Statistics cannot relinquish authority for control over the consistency of national vital statistics. Vital statistics of a country have little value unless they are internally consistent. In production of national vital statistics by the use of the statistics produced by State offices, the requirement of consistency becomes all-important. Agreements are not enough. Consistency in practices is so vital that the degree of consistency must be checked adequately and

continually, and alternative procedures must be available for use if consistency is not maintained.

Training and Educating Personnel

The fourth element of a coordinated system is to provide means of training and educating personnel. Vital statistics offices at all levels are handicapped by a severe shortage of personnel with sufficient academic and practical training in the techniques of vital registration and vital statistics. Training is a matter of deep concern to all levels of government. It is carried out through in-service training programs when these are practicable, through formal courses in public health schools, and through organized seminars designed to teach practical skills. The Point IV program at the international level is an effort directed at developing knowledge and skills through grants-in-aid, training centers, consultation, and other means.

Citizens Abroad and Naturalized Citizens

Vital records of American citizens abroad and of naturalized citizens at home and abroad should become an integral part of a coordinated system of vital records and statistics, if it is to be effective as a whole. A conservative estimate of the number of American citizens outside the United States during 1952 would be over 1,500,000. While abroad, many of them marry, have children, obtain divorces, or die. Records of these events are made and filed according to a multitude of foreign laws and practices; certain other records may be made—by various Federal and State agencies—when the citizen or his family comes back. But there is no single national focal point of coordination, no single custodian of such records. Considerable confusion and hardship result, for example, when a family returns from a tour of duty overseas and attempts to settle down in an American community. Are the children citizens? Are they of school age? If the parents have no records to prove such facts, where can they get them? Similar problems plague naturalized citizens, and families that have adopted children born overseas. Undoubtedly, Federal legislation will be required to straighten out this problem. While details remain to be worked

out, those who have studied the matter are in general agreement that coordinating and custodial responsibility must be vested in a single Federal agency.

Annual and Cyclic Records

Means for coordinating the planning and production of annual and cyclic vital statistics are a sixth essential element of a coordinated system. Most of the cyclic production is on an annual basis, but for many series the cycle may be shorter—for example, the “disease year” for polio and other diseases—or longer, as for the variety of series based on the decennial census. The objective is not only to produce these series at maximum efficiency but to shape the output of facts so as to enrich their significance and value to society. While the National Office of Vital Statistics has primary responsibility for this type of coordination, it must work closely with State and international agencies, including consuming agencies as well as producers.

Special Studies

Means for coordinating the planning and parceling out of vital statistics special studies are a seventh element of a coordinated system. In its historical development, vital statistics organizations have emphasized massive, overall statistics—based on all birth certificates or all death certificates, and so on. A way must be found to obtain greater balance and variety by replacing this approach, wherever practical, with sampling statistics and special studies. Instead of including every item on all certificates, desired supplementary items might be added in only one or two States, or for short periods of time. Through these and other types of studies on limited groups, a broad variety of sample data could be assembled from which to interpret the massive data. Studies undertaken in one area should be designed so that results will be applicable in many other areas. By a planned distribution of the work among statistics agencies at all levels of government, the significance of the total output could be greatly increased.

Population Estimates for Small Areas

An eighth essential element is the provision of population statistics and population esti-

mates for small areas. Adequate population data for computation of vital statistics rates are indispensable to the vital statistics field. The production of national population census data and estimates is a responsibility of the Census Bureau. Since the greatest use of both health statistics and vital statistics is made at the local level, population estimates must also be made available for small areas as well as for the country as a whole and for the States. The lack of adequate estimates of population for small areas has recently brought about an active and aggressive movement of State registrars and public health statisticians to promote a mid-decennial population count in 1955, but the prospects of achievement appear dubious.

Resources should be found to approach the problem of developing new procedures for estimating the population of small areas. This would seem to require a cooperative program on the part of the States, the Bureau of the Census, and the National Office of Vital Statistics to explore the potentialities of school census material and every other available source of relevant data.

Morbidity Statistics

Morbidity statistics, including morbidity reporting and health surveys, are closely related to vital statistics, though not an integral part. As mentioned earlier, they are linked to vital statistics through a common classification for sickness and cause of death. In addition, both morbidity and mortality data are needed for case-fatality rates.

Sampling studies and health surveys are also closely related to vital statistics. It is necessary for both sickness statistics and those of birth, death, marriage, and divorce to relate such events to the way people live. In the future, vital statistics must be concerned to an increasing degree with sampling studies designed to broaden interpretation of the data. In particular, study should be made of the population type of survey mechanism, which offers a means of filling the gaps in our knowledge and, at the same time, holds forth the possibility of broadening the interpretation and usefulness of existing reservoirs of clinical, hospital, and health data.

Cross-Indexes

In the long run, a coordinated system of vital records and statistics might well take advantage of the values inherent in cross-indexing the conglomeration of vital records that are created for each individual throughout his lifetime. Such an index, operating on a national scale, may ultimately be needed not only to serve the record needs of our mobile population, but also to facilitate the longitudinal and followup studies required for medical research and public health. Fear has been expressed by some persons that such an index might serve repressive purposes, but many others feel that the strength of our democratic institutions gives sufficient security to the individual. To bring a national index into being would require, of course, a Federal enabling act, a national focal point, and a series of complementary State laws and regulations.

Conclusion

These then are some of the elements which deserve consideration in the formulation of a coordinated system of vital records and statis-

tics. But whatever the number of elements, however defined and located, there is no solution to the complex and enormous problems posed to the producers and users of vital records unless considerable uniformity can be introduced into the methods, forms, and definitions used by localities, States, nations, and the international agencies. Great strides have been made in development of a focal point which would work consistently for the coordination of vital records throughout this country.

In the immediate future lies a much more intensive campaign to improve the coordination of vital statistics through the extensive development of special studies and health surveys aimed at broadening the interpretation and significance of vital statistics in relation to other types of social and health information.

Perhaps most important of all is to stimulate the creation of a concept of a coordinated system of vital records and vital statistics. The concept of such a system must be developed as a whole, and it must be a concept to which all involved can wholeheartedly subscribe and which—primarily—will satisfy the needs of its millions of users.

Assistants to the Secretary Appointed

Georgia France McCoy of Oklahoma City, Okla., has been appointed assistant to the Secretary of the Department of Health, Education, and Welfare.

Since 1949, Mrs. McCoy has held administrative and research positions in the department of physical medicine and rehabilitation at the New York University-Bellevue Medical Center in New York City. Recently she was executive administrator of a gerontological service at the medical center.

Mrs. McCoy has had many years of public service in administering social work activities.

Donald M. Counihan has been appointed assistant to the Secretary of the Department of Health, Education, and Welfare. He will serve as legislative liaison officer.

Mr. Counihan received his law degree from Marquette University in 1946 and engaged in private practice in Milwaukee prior to serving as administrative assistant to U. S. Representative Charles W. Kersten of Wisconsin in 1947 and 1948. In private practice in Washington, D. C., before his recent appointment, Mr. Counihan is a member of the American, Wisconsin, Milwaukee, and District of Columbia Bar Associations.

Investigation of Jute Imports As Potential Plague Source

By EDGAR W. NORRIS, M.D., LEWIS B. SCHNEIDER,
LELAND J. HANCHETT, M.D., CHARLES E. KOHLER,
and WILLIAM F. BUREN

SEVERAL plague outbreaks along the west coast of South America over the past 20 years have been traced to infected fleas found in shipments of jute bags from India (1,2). It has been demonstrated also that infected *Xenopsylla cheopis* fleas can survive and transmit their infection after being trapped in bags for 30 days or more under optimum conditions of temperature and humidity (3). Since the United States imports from India approximately 350,000 tons of jute products annually, the possibility of plague introduction through this medium seemed to warrant investigation.

Between August 1949 and March 1951 the quarantine stations at San Francisco, Calif., and San Juan, P. R., conducted systematic examinations of all jute imports to determine whether or not evidence could be found of flea infestation. At San Francisco studies were conducted also to determine the survival rate and the longevity of *X. cheopis* under conditions as they prevail in the baling and shipping of jute products.

Methods Employed

At San Francisco shipments of jute from India consist principally of bolts of hessian cloth in large bales and arrive at weekly or bi-weekly intervals. Through the cooperation of

Dr. Norris is medical officer in charge, and Mr. Schneider is quarantine inspector, of the San Francisco Quarantine Station. Dr. Hanchett is medical officer in charge of the San Juan Quarantine Station, and Mr. Kohler and Mr. Buren are sanitarians assigned to the Communicable Disease Center activities in San Juan, P. R.

the importers random bales were selected. The wrappers were removed and random bolts of the jute cloth were taken out for examination. The wrappers and the jute cloth were unraveled, shaken, and brushed over a white bed sheet. These brushings were assiduously searched with high-power magnifying glasses for insects or parts thereof, and the inspectors were constantly alert to detect any insect movement. To test the keenness of the inspectors' perception, on several occasions known numbers of dead fleas were scattered about in the jute debris which had been searched previously with negative results. Upon reexamination of this debris the inspectors recovered all of the fleas which had been deposited.

Three hundred and seventy-six examinations were made of wrappers and samples of jute cloth aggregating 152,000 yards taken from 880 random bolts removed from 179 random bales. Any insects or particles suspected of being parts of insects were collected and delivered for identification to F. M. Prince, entomologist, at the Western Branch Communicable Disease Center Laboratory. No fleas, alive or dead, were found nor were any parts of fleas identified by microscopic examination.

At San Juan the jute imports consist principally of manufactured bags or gunny sacks. The examinations there included a microscopic search for fleas in all of the material shaken and brushed from the bags. The brushings were thinly spread over white paper which had been coated with a film of castor oil and tacked to light plywood for ease of handling. The low-power objective of a wide-field microscope was employed, using a very bright focusing light to illuminate the field. The examinations and identifications were made by an entomologist. The wrappers of 67 bales and a total of 4,994 bags were examined. One hundred and eighteen insects were found, of which 89 were alive, but all were identified as being of genera and species indigenous to Puerto Rico; none of these insects were fleas.

Observations on Vitality of *X. Cheopis*

In the study of the longevity and survival rate of *X. cheopis* under actual conditions of

processing and overseas shipment, conducted by the San Francisco station, the fleas were furnished by the Western CDC Laboratory. On September 15, 1949, 30 live, well-fed, noninfected *X. cheopis* were placed in each of two 9- by 14-inch cotton bags, which then were securely closed. One bag was placed between layers of jute about midway in a bale, and the second was placed under the first layer of jute. The bale was then wrapped, pressed in an electrically powered baler, sewed, and bound with flat metal strips. It was loaded in a cargo hold of a vessel of the Pacific Far East Line bound for Manila, Hong Kong, and Okinawa, and return. When this vessel returned to San Francisco 49 days later, November 3, 1949, the bags of fleas were removed and examined at the laboratory. From one bag 29 fleas were recovered and from the other, 28 fleas; all were dead. The 3 missing fleas were presumed to have escaped before the bags were tied prior to shipment.

On November 10, 1949, 150 live, well-fed, noninfected fleas were placed in a small cotton bag containing a small amount of wood shavings. The bag was secured, placed in a cardboard container and encased in a wooden box. This was placed in the hold of a vessel of the Matson Navigation Company bound for the Hawaiian Islands. Upon return of the vessel to San Francisco on December 3, after a voyage of 23 days, the box was removed and 146 fleas were recovered; all were dead. Four of the original 150 fleas were unaccounted for. Upon microscopic examination, the bodies of the recovered fleas did not appear to be undernourished, and it is believed that death was not due to starvation.

On December 15, 1949, 100 well-fed, noninfected fleas were put in a wooden box in which two freshly cut apples were placed to supply moisture. This box was shipped on a round trip to the Hawaiian Islands in the hold of a vessel, and 22 days later, upon return to San Francisco, 100 fleas were recovered from the box; all were dead.

Effect of Extreme Pressure on *X. Cheopis*

Tests were performed also at San Francisco, through the cooperation of the Western CDC

Laboratory and one of the importers, to determine how much the pressure of the baling process may contribute toward the mortality of the fleas trapped inside the bales. Three cotton bags each containing 25 *X. cheopis* were placed at different levels inside a bale of jute wrappers which was then compressed under a pressure of about 8,000 pounds—less than the pressure normally employed in the commercial baling of hessian cloth. That experiment was performed on two occasions, November 15 and December 15, 1949, with practically the same results. At the end of 10 minutes following the application of the pressure by the electrically powered mechanical baler, approximately 33 percent of the fleas were found dead; at the end of 1 hour 50 percent were dead and at the end of 72 hours more than 75 percent were dead. These observations seem to indicate that the pressure exerted in the baling process is an important factor in reducing the chances of survival of fleas trapped within bales of jute products.

Conclusions

The variations of temperature and humidity in surface vessels, incident to changing latitudes and passage through various ocean currents, are inimical to the rat flea in the absence of its natural host. Its survival is further jeopardized when trapped in jute and subjected to the pressure exerted in the baling process. If well-nourished, noninfected fleas have little chance of survival under these conditions, plague-infected fleas should be expected to have even less chance because of the additional hazard of the bacterial process causing obstruction of the stomach. Due to this blockage, the average length of life of *X. cheopis*, after being infected with plague, is only 14.5 days under relatively favorable conditions (4).

Past experience with the tremendous annual importations of jute cloth and bags and the observations presented in this report seem to validate the statement made by the Public Health Service in 1937, that "While it may not be without the realm of possibility that, under favorable meteorological conditions, fleas with-

out a host can serve as reservoirs of plague infection, carry it over long distances and later, under favorable conditions, transmit the disease, such danger is probably insignificant in comparison with the danger from infected fleas carried by rats" (5).

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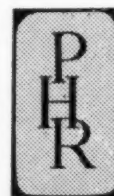
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To the Professional Public Health Worker

You, like the specialist in medical and other fields of science, know how important it is to be informed on current knowledge in your specialty. And, for the most part, you rely on the first-hand availability of the leading journals and periodicals in your specialty.

But as more becomes known of public health practice and research, the more complex this science becomes. There comes too the need to relate the activities of all its component disciplines—the members of the family of public health—one to the other, and each to the whole. And for each specialist there is a need to read regularly the journals devoted to unifying the family of public health. *Public Health Reports* is such a journal.

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Public, Professional, Industrial Allies In Sanitation

By MARK D. HOLLIS, C.E.

UNTIL RECENTLY, three classic approaches have dominated the public administration of sanitation. The most primitive approach by the sanitarian was to carry a big stick. A more sophisticated approach was to speak softly and carry the big stick in a velvet glove. With the advent of epidemiology, it proved effective to speak cogently and to carry a slide rule. Today we have reached a point where public officials may expect sanitation to prevail mainly on a cooperative basis. The pressure to comply with approved sanitation practice now rises less from a fear of epidemics or of legal sanctions and more from a desire for good living and common realization of mutual interest. The activities of official health inspectors have been augmented and to a great extent reconstructed by the emergence of sanitary habits, practices, and customs in the general population and in industry.

The emergence of the modern mood in sanitation has stimulated the following comments on its development.

From Resistance to Collaboration

At the outset, it may be well to recall that advances in sanitation never have come easily. It is only human to resist change, and, to a moralist, resistance seems to be compounded when the change is beneficial. Impatient with such resistance and perhaps imbued with a

deep sense of righteousness, the sanitarian in the past tended to resort to police power rather than rely upon persuasion.

The dilemma of the early sanitarian was expressed in Lemuel Shattuck's eighth recommendation: that "Local Boards of Health endeavor to carry into effect all their orders and regulations in a conciliatory manner; and that they resort to compulsory process only when the public good requires." He commented, "In carrying a public measure into effect, the favorable opinion and cooperation of the people is desirable." But Shattuck did not feel that such cooperation was essential. Rather, he cited the summary power of the Commonwealth and its "duty to interfere" to remove a health hazard. "Public safety requires it—human life demands it," he wrote (1).

Sir Edwin Chadwick, the author of the modern sanitary awakening, was deposed from office for his zeal (2). His determination to clean up London created such a storm of opposition that the *London Times* commented in 1854, "Aesculapius . . . in the form of Mr. Chadwick [has] been deposed, and we prefer to take our chance of cholera and the rest than be bullied into health—England wants to be clean, but not to be cleaned by Chadwick."

So much has the attitude toward sanitation changed that today the public appeals to the professional sanitarian and the public health official for advice and guidance. As to sanitation of interstate carriers, a direct responsibility of the Public Health Service, there has been a distinct gain in cooperation even within the past 5 years. For example, the Joint Com-

Assistant Surgeon General Hollis is deputy chief of the Bureau of State Services and chief engineering officer of the Public Health Service.

mittee on Airline Sanitation, composed of representatives of the Public Health Service, the airlines, and catering companies, has found that commercial interests are eager to establish and comply with the committee's recommended sanitary requirements. These are now advanced almost to the point of formal publication. Progressive leaders of the restaurant trade have shown a similar spirit. Several railways have provided dining car supervisors, trained in sanitation practices, to conduct inspections to meet and even supplement Public Health Service requirements. Progressive railways go well beyond the essential requirements of dining car sanitation. Such efforts permit a public inspector to become more of a guide, teacher, and counselor and less a detective or policeman.

An increase in private assumption of responsibility for sanitation certainly does not warrant the abdication of State responsibility. Nevertheless, evaluation of health department sanitation services in the future may well consider how much of the activity conducted at public expense might be conducted by private enterprise with greater efficiency and economy. The Public Health Service's evaluation of the big stick policy has led to placing primary and major emphasis upon education and technical guidance. All the Service handbooks on sanitation practice and standards stress the technique, the purpose, and the advantage of sanitation rather than legal requirements and penalties.

The fall of Chadwick did not terminate the assumption of summary power by State authorities, nor did it quench the zeal of other sanitarians who fought for public health reforms, with or without power to install them. Meanwhile, experience has demonstrated what the prophetic Shattuck assumed that "the favorable opinion and cooperation of the people is desirable." We have learned to appreciate how much enforcement is an extravagant waste of time that might be spent more productively on guidance. We have come to understand the frustrations in a policy that condemns the sanitarian to repeated inspection of chronic violations. And we have come to see that the development of a cooperative program of sanitation standards, education, and compliance will

reduce routine inspections and enforcement actions by health officials and improve sanitary conditions.

This transition in policy did not occur overnight. It had its origin in the first stirrings of modern sanitation. We are not even near the end of the passage. Still it seems that a century of public health practice has brought to adolescence if not to maturity the ideal of sanitation imposed by self-discipline and cooperative action.

Institutions for the Modern Mood

In response to this changed situation, we have developed relatively new health institutions. These institutions appear to be genuine mutations in the social evolution of public health, if their development can be said to resemble the origin of species. Not only are they genuine mutations, but they were to be expected. Social history accepts the fact that the modern corporation, the cooperative association, the trade unions, and the industrial unions were born to meet emergent economic needs, and that interstate authorities, regulatory commissions, and associations for trades, professions, and governments were formed within the past few generations to meet specific administrative needs. The necessity for such new institutions today may seem obvious, but few are able to discern such a need when new social forms and institutions are in embryo.

The field of public health in the past century has had other mutations. We have seen the development of the professional organizations of medicine, sanitary engineering, nursing, and dentistry, the formation of boards of health and departments of health, the growth of public hospitals and health centers, and a proliferation of research institutions, clinics, laboratories, and insurance systems. These institutions have resulted from a broadened appreciation of health practice. The recognized domain of health work has become so broad that today's employees in public health agencies and the professions named above account for but a small part of the total economic activity devoted to protecting and improving the health of the community.

Since the beginning of the public health

movement, there has been a valuable auxiliary force of volunteers, from Florence Nightingale to a host of national and community voluntary associations. Voluntary organizations today play a most useful role in securing popular understanding of public health programs, and for supplementing private health services with experiment and research.

In addition to such voluntary public and professional organizations, we have a major category of those who are public health servants largely by association. They are not always conscious members of the open conspiracy to improve public health. Much of the important activity in fields bearing directly on public health is under commercial management which is often unaware of the full importance of its health role, because it operates primarily with technical or economic objectives. Such management is neither indifferent nor hostile to public health. It is simply for the most part not primarily directed toward health goals. The gain to health is coincidental if not accidental. Nevertheless, no one will deny the contribution of such enterprises as soap, paper, pesticide, cement, or steel production to the elevation of health conditions. In the large sense, nearly everyone is in business for our health. Usually, where economic and technical enterprises have come in direct contact with the public health profession, as in the milk and food industries, managerial cooperation with health authorities has been predominantly sincere and effective. In the control of pollution in water and in atmosphere some of the most practical and effective support is found among enlightened managerial figures who believe that what is good for the community is best for private industry.

A Meeting Ground

In this situation, it was to be expected that institutions would emerge to provide a common ground where various elements, whether engaged directly or obliquely in public health work, would meet to work out a common program. The need for such a meeting place has been intensified by the extraordinary specialization and compartmentalization of health work.

The need for a meeting ground was suggested also by the fact that, in this complex, specialized society, the business of bringing together strangers who ought to meet in a common interest has in itself become something of a specialty.

Consequently, allied interests have developed such institutions as the National Sanitation Foundation, the National Safety Council, the Public Health Committee of the Paper Cup and Container Institute, the Chemical Products Labeling Committee, the 3-A Committees on Sanitary Standards for Dairy Equipment, and many others. While there are many variations in their structure, it is clear that these organizations are a new breed. Not purely public, private, professional, or commercial, their distinguishing characteristic is that they represent a joint effort to blend the public interest, prevailing legal requirements, the best scientific judgment, and sound commercial practice in the economic activities that bear on sanitation.

The Public Health Service finds itself involved with such organizations in several ways. Representatives of the Service work with representatives of commercial interests and others on multilateral committees organized by such responsible agencies as the National Research Council. We also form bilateral joint committees with industry, such as the one which is drafting a recommended code for poultry sanitation. And we serve as consultants to unilateral industry committees such as the committee which is developing sanitation standards for the baking industry. With so many possible permutations of such arrangements, each of these organizations is free to determine what operating structure best serves its purpose. The chances of successful cooperation among the allied interests would seem to require joint contribution of funds or services from the respective public, legal, scientific, and commercial interests. For this reason, and because of its association with the Committee on Food Equipment Standards, the National Sanitation Foundation is a good example of the cooperation that seems likely to characterize a great part of sanitation activity in the future.

Like these other organizations, the National Sanitation Foundation was an organic response

to a social challenge. The men who have assisted its growth declare that they have been the instruments of this response, rather than the authors.

The need for a common meeting ground for the allied interests in this phase of sanitation was not obvious to all. Nevertheless, it was a genuine need, a popular need. This need could not have been satisfied by existing agencies in public health, working by themselves alone. The overburdened health departments too seldom have time to look up from their heavy tasks to see new opportunities ahead. And professional organizations cannot seek to meet the needs of industry any more than a trade association can presume to serve a profession. But an independent organization like the National Sanitation Foundation can combine these interests. Such organizations make it easier for representatives of industry, the professions, and public agencies interested in a particular phase of public health work to combine their energies and to achieve common objectives, such as uniform equipment standards for the food service industry. Their services may be broadened even further to the extent that labor and consumer organizations take part in their future activities.

Uniform Sanitary Standards

The need for consistent standards for food equipment gave the National Sanitation Foundation its first concrete and specific enterprise. Similarly, professional societies and public health agencies have made many useful contributions to resolving the need for standards in this field. A great deal of progress has been achieved by the milk industry and health agencies working through such groups as the 3-A Committees on Sanitary Standards for Dairy Equipment. Similar joint action has been taken by those associated with the Baking Industry Sanitation Standards Committee. Also, many individual food equipment companies have been working with public health agencies directly to develop sanitary standards for their respective products. The Foundation was founded in response to a feeling among members of the food industry that a broad approach

was required to progress specifically against variations and gaps in municipal regulations and their interpretations. The available machinery for resolving the variations and filling the gaps in such regulations did not satisfy the needs of the responsible interests concerned. For the purpose of accelerating the solution to some of these difficulties by practical, democratic, and reasonable means, a cooperative body was formed on invitation by the National Sanitation Foundation.

This body, the Joint Committee on Food Equipment Standards, represented five national professional sanitation organizations and the Public Health Service. Included were the International Association of Milk and Food Sanitarians, the National Association of Sanitarians, the Engineering Section of the American Public Health Association, the Conference of State Sanitary Engineers, and the Conference of Municipal Public Health Engineers. The committee was organized following the Foundation's first National Sanitation Clinic, a 1948 meeting in Ann Arbor. More than 400 guests of the Foundation met in this clinic to discuss food sanitation. Participants in this meeting included authorities from local, State, and Federal Government agencies, from commerce and industry, and from universities and professional associations. They recommended development of standard practices and equipment criteria, and simultaneously the establishment of a testing laboratory that would serve industry, government, professionals, and the public.

The fact that the National Sanitation Foundation is supported by contributions of funds from industry and services from government, professional associations, and the university world puts it at the fulcrum in such a balance of interests in sanitation.

The activities of the Joint Committee have been described elsewhere (3). It is sufficient to note here that the series of standards for the food industry which were worked out by the committee in consultation with industry, government agencies, and professional societies are being published by the National Sanitation Foundation. New equipment which meets these standards will be authorized by the testing laboratory to carry the Foundation's NSF

insigne, as an aid to all concerned with appraising equipment design and construction. Thus, the doubts and problems of the industries and the regulatory agencies both should be materially reduced, because there is every ground for confidence that as much cooperative effort will go into the application of these standards as went into their creation.

The first standards published apply to soda fountain and luncheonette equipment (4). Standards for food service equipment followed (5), and standards for spray-type dishwashing machines are next in view. The dishwashing machine standard, based largely on research conducted since 1944, has been delayed pending further study. All such publications are a welcome and useful supplement to other efforts to raise sanitation levels, such as the operating codes recommended by the Public Health Service.

Since manufacturers and health authorities joined in drawing these standards, it is expected that they will be acceptable to every city and State health department and that they will resolve differences among local health ordinances governing such equipment. This achievement is indeed a milestone in the progress of health services.

The Means to an End

But the significance of this movement does not lie with the standards so much as with their purpose—to contribute to health by improving the American environment. Standards are not an end in themselves. They are merely a means to improve living and working conditions.

Organizations like the National Sanitation Foundation, by such practical devices as these publications, may labor aggressively and experimentally for progress in public health. With a university background, they can be both informed and impartial. They may contract freely, as private institutions, to work on a specific problem proposed by a responsible source. At the same time, they should be bound by professional and official associations to seek the public advantage.

Through its laboratory and insigne, the Foundation aims to encourage acceptance of

the Joint Committee standards. The laboratory will furnish experimental evidence to evaluate equipment. The seal will identify equipment that equals or surpasses basic standards. Such a seal of itself does not assure the sanitary use of equipment. Its significance depends upon the reputation of the forces behind it. This is true of every symbol, from a common trade mark to the American flag.

As the activity of the National Sanitation Foundation laboratory expands, its seal will gain in significance. But the value of such a seal fundamentally will be reflected by its use by industry and by regulatory agencies. No system of laboratory examinations, legal penalties, or other enforcement techniques, however careful, is as effective as free agreements honored among mutually contracting parties.

Private institutions like the Foundation are especially free to encourage experiment with public health methods, including educational activities. They can undertake activities which meet deeply felt needs of community action programs in public health. The potential educational power of such cooperative organizations is one of their most promising aspects.

There is still, after a century of public health work, a serious need for community campaigns of health education which a public or professional agency cannot ordinarily satisfy. A governmental agency is obliged to be conservative in education activity, in deference to the principle that government is the servant of the people and not their schoolmaster. Professional organizations by their nature are more concerned with the special interests of their members than with general needs of the public.

Private organizations, however, if sufficiently endowed, can encourage a bold and experimental approach in educational services.

If there is an element of rivalry and competition in such educational programs, all the better. If the community is to have its money's worth from health education, citizens ought to enjoy an opportunity to compare the relative performances of different kinds of organizations and institutions. In competition of this kind, it is unlikely that the public will be the loser.

The major value of these new institutions,

however, is not that they may be more zealous, dynamic, and enterprising than professional or official bodies. These virtues are welcome, but they are but a supplement to their prime function—to provide a common forum and instrument for allied interests in the field of sanitation. Should they contribute further to stimulating comprehensive sanitation activities (6), helping the social forces of the Nation to put a new face and a new heart into American neighborhoods, they will more than have fulfilled their promise.

Summary

In summary, there has been a need for institutions which will accelerate agreement and action on progressive sanitation measures among the many allied interests in this field. The organizations formed by these allied interests have already encouraged cooperative action among governmental, professional, and industrial organizations. They have helped to achieve a uniform approach to sanitation design and construction of equipment. As they de-

velop, they can help also to satisfy some of the needs for health education and research. The competitive aspects of this situation should be healthful in every sense of the word.

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Dining Car Sanitation Award

The Erie Railroad has been awarded a special citation by the Public Health Service for being the first major line whose dining cars have all been awarded the Certificate of Sanitation under the cooperative inspection program of the railroads and the Public Health Service.

To achieve the Certificate of Sanitation a dining car must receive a rating of at least 95 percent by a Public Health Service dining-car inspector. The inspection is based on a check of 128 separate items involving both basic construction of the car, particularly the kitchen and the pantry, and maintenance of sanitation. The standards for dining-car sanitation were established several years ago by the Public Health Service in cooperation with representatives of the railroads.

The citation was presented June 3 at a special ceremony in Jersey City.

The Value of Good Service Statistics In a Modern Health Department

By EVELYN FLOOK

WHAT ARE service statistics? Why are they needed? How are they produced, and how should they be used? What is their value to a health officer or to a health program director?

Every public health worker is apt to define service statistics differently and according to his own particular experience and interest. A useful definition is this:

"Service statistics in public health are numerical measurements of services rendered to individuals and to the community through public health programs."

That definition, developed by the Working Group on Service Statistics of the Public Health Conference on Records and Statistics, represents a composite formulation of operating statisticians associated with local, State, and Federal health agencies (1, 2).

Service to People

Perhaps the most important concept concerning service statistics is that they should reflect

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For the past 2 years, Miss Flook has been chairman of the Working Group on Service Statistics of the Public Health Conference on Records and Statistics.

service to people and not attempt merely to measure volume of activity of the health department staff. There is a fine distinction between the traditional activity counts—enumerations of nursing and clinic visits for various purposes or of sanitary inspections of different types of establishments—and the kind of statistics which focuses attention on numbers of persons served and types and amount of service received. With the traditional counts, quantitative evidence is being accumulated to describe how each public health worker spends his time—how much effort is being expended for each separate program. With the latter type of statistics, information is being collected on the results of that effort.

"Measurement of results" then, is the key to what we want to achieve with service statistics. The term "service yield indices" is an apt phrase. Just as a farmer finds it necessary, if he is to know whether he is operating at a gain or loss, to reckon the number of bushels of wheat or bales of cotton he gets per acre in return for the labor and expense of production, so the public health worker must calculate the service being rendered to the community in relation to the need for service.

Discussing operational statistics from the viewpoint of a local health administrator, Mattison (3) notes that "it is remarkable, with a few outstanding exceptions, how little really useful information has been available to us health officers in the past in the way of quantitative relationships between morbidity, mortality, population characteristics, and public health services."

Service statistics, to be meaningful, must be related to such baseline data as population by age groups; morbidity, natality, and mortality information; information concerning the health needs of special groups; information about health facilities, services, and personnel available under public, voluntary, and private auspices; information concerning housing, sanitation, and the nutritional and general economic status of the community; and information reflecting expenditures. True measurements of accomplishment cannot be arrived at by counting units of service alone. Quantitative relationships must be established between the services rendered and the health problems to be solved.

In reviewing data for administrative planning, Mattison also points out that unfortunately the one thing usually missing from the kinds of data usually collected in a local health department "was any cross relationship of services to population served or even associations of differing population patterns with differing specific mortality or case rates. Nor are the sanitation inspection figures usually related to the total need in terms of numbers of institutions of the various types inspected and results attained in securing abatement of violations for any particular inspection unit" (3).

For Program Guidance

Service statistics are needed as guides for the three main segments of health department administration: program planning, program operation, and program evaluation. The science of public health has developed to the point where it must be selective in its undertakings if it is to move forward consistently toward a goal of "positive public health" for all.

Intelligent evaluation, stemming from objective data, is the touchstone of progress for any health department. If the public health dollar is to accomplish the maximum good, it must be spent in the area of maximum need. Our efforts must be addressed to the most serious health problems, program emphasis must be shifted as the problems change, and, in each instance, methods used must be those producing the best results. To obtain assurance, there

must be continuous program evaluation and re-direction of planning when necessary.

Like other problems in contemporary society, public health problems are in a state of constant flux. The character of health needs has changed along with changes in the social and physical environment and improvements in the standard of living. Fifty years ago when the local public health movement began, many parts of this country were faced with epidemics of serious proportions; with outbreaks of such infectious diseases as diphtheria, smallpox, typhoid fever, and malaria; and with high maternal and infant death rates. Public health workers naturally turned to preventing and controlling epidemics, to curbing the infectious diseases, to insuring a clean and wholesome physical environment.

Over the years, however, the character of public health problems has undergone considerable change. While many communicable diseases have been virtually conquered, the volume of chronic and long-term illnesses continues to grow. The health of mothers and children has undergone constant improvement, but we are only beginning to look at the needs of the aging group in the population. Various safeguards have been developed to protect the physical environment, but the increased use of chemicals and other new substances creates hazards unknown or unappreciated in the past and in many instances still not fully comprehended.

Good service statistics help keep a modern health department modern. They help define the health problems of the community at any point in time. They help measure both the extent of a program and its effectiveness in relation to the problems. By thus appraising programs and charting paths of action, they furnish a basis for future program planning. If properly used, they can be a sensitive barometer of need for more or less attention to any given problem, in any particular location, at any special time or for change in methods or techniques. Just as it is wasteful to continue the performance of outmoded public health practices long after the need for them has passed, so also is it disastrous to discontinue prematurely the fight against a public health problem. Eternal vigilance is essential if gains already

made are to be maintained. Only then can new problems be attacked in orderly process.

And what place do good service statistics have in program operation?

Service statistics should, for the most part, be a byproduct of administrative operation of a program. Maintenance of records, and compilation and interpretation of statistics, should be an integral part of program management. Only a few examples of the many uses of service statistics for program management need be mentioned. Reports of clinic attendance might suggest changes in clinic policy, dates, hours, or location in order to adjust services to needs. Such reports may also be considered as leads to the effectiveness of home nursing visits. Total clinic visits related to physician time can be used to evaluate clinic policies. Broken appointments and failures to respond to recommendations are signals for closer scrutiny of operations to discover "soft spots." Summaries of program activities provide a basis for determining personnel needs and for justifying specific types of expenditures.

For the guidance of program operation, the value of periodic analysis of individual case records should not be overlooked. Case records of individuals served by the health department constitute the best source of service data in a well-conducted department. A comparison of performance as revealed in the record against the department's stated plan and criteria of service permits a critical appraisal of the adequacy of actual performance. It is an excellent tool for supervision.

Compilation of service statistics by periodic case record analysis is less expensive and more valuable than the accumulation of a vast quantity of uninterpreted data, which is still a wide practice among public health agencies. To illustrate:

If all known tuberculosis cases are analyzed once a year to determine how many are patients in the hospital, how many are patients at home, the sputum status of those at home, and the number of tuberculous individuals at home who were last examined more than a year before, attention is being focused on a specific problem and the health department's success, or lack of it, in keeping individuals under supervision.

If, in addition, records of all new tuberculosis cases are examined to determine the stage and age of the case, attention will be drawn to the success of case finding.

A summary of this type of data provides appropriating bodies with a better understanding of the health department program and its needs than does the traditional count of visits, inspections, admissions to broad categories of service, and so forth. In order to demonstrate the advantages of related statistics, it may be necessary to furnish both types during the transition period, although that is questionable. Public officials ask for evidence of health department effort in terms of gross volume because that is the variety of information they have become accustomed to receiving. There is nothing mysterious about the more searching kind of statistical information, and there is no real reason why it could not be substituted for straight, unrelated counts.

Good Service Statistics

What characterizes good service statistics?

First, they must be developed in line with clearly defined program objectives. Sound statistics do not just happen. They are based upon previous determination of the precise kind of data needed for each purpose. Each item of information must be significant for the specific purpose it is designed to serve, and the exact purposes to be served have meaning only in relation to what a program is designed to accomplish.

Second, the information accumulated must be valid and readily available. The units of measurement to be used should be determined jointly by the program directors and the statisticians prior to beginning their collection. Such program personnel as physicians, nurses, nutritionists, social workers, health educators, and statisticians should take part in developing plans for the collection of information needed.

Third, good service statistics should be limited to a scope and volume commensurate with reasonable cost, time, and effort of production. Collection of statistics—no matter how good—as an end in itself should be discouraged.

Let us consider a few concrete examples of good and not-so-good service statistics. Mere

counts of activities, without being related to the need or demand for a service, add little to knowledge of the problem or to program planning. For instance, in regard to immunization, it is the level of immunization in the community that is important. Counting the number of immunizations given at specified places falls far short of providing that essential knowledge. But the more valuable service statistics—those measuring services to individuals—are based on counts of the patient load according to: whatever breakdowns (age, sex, race, residence, and so forth) are significant; and the categories and amount of service received, grouped so that service is related to the particular health problem. As another example, more useful information on maternity services can be obtained by relating antepartum, delivery, and postpartum services to the women who were delivered of babies within a specified period of time than by using unrelated counts of the three types of services.

Shown in the box below is a pattern of service statistics for a tuberculosis screening activity which relates activity to the problem, specifically, the number of persons screened to the population concerned. Visualize these statistics on a descending scale, as illustrated, with each indented entry a fraction of the preceding one.

By such relationship of information, the number for whom rechecks were recommended, the percentage of tested individuals who had evidence of tuberculosis and the number of diagnoses confirmed by private physicians provide a

Pattern of Service Statistics

Total population.

Percentage of population screened.

Population (numerically) screened.

Number of films read.

Number referred for large X-ray.

Number receiving large X-ray.

Number referred to physician.

Number of referrals completed.

Number diagnosed as active.

guide to the validity of the test. The number for whom rechecks were recommended and completed is an indication of the adequacy of followup. Reporting on this basis makes possible good comparison of services between various reporting areas and between selected periods of time.

Use of Information

Even though we accept in principle the importance of having good service statistics in a modern health department and apply sound criteria for accumulating meaningful statistics, tabulation of such data does not in itself provide for its optimum utilization. To be of real value, information should not only be useful, it must be actually used. We are fortunate in having available a few guide lines to use of statistical data as well as to production.

The periodic review of individual case records has already been mentioned. Case record analysis should be made regularly, but it should be limited to stated times: quarterly, semiannually, or annually. This reduces handling and permits more thorough analysis of each service.

Perhaps the most orthodox method of presenting statistical data is in the form of summary tables or reports. Reports should be prepared only to fulfill definite purposes. The frequency with which they are prepared must be determined locally, depending on the use to be made of the information assembled. Caution is urged against more frequent tabulations than are justified by actual use. Compilation of service statistics on a calendar-year basis is usually most satisfactory for comparison with baseline data. Where statistics are used for fiscal purposes, compilation on a fiscal-year basis should supplement, but not substitute for, calendar-year data. Narrative analyses and graphic presentations are important adjuncts to statistical tables in the interpretation of numerical measurements of service. Such interpretation includes correlation with baseline data, with expressions of needs for services, and with program objectives.

More extensive use should be made of special, short-term studies, aimed at answering specific questions, as a device for reducing the number and complexity of routine reports. Routine re-

ports should concentrate on minimum essentials for reflecting program activities and should avoid overrefinement of data. Special studies permit more critical analysis of a selected segment of a program for a limited period of time and do not overburden the staff indefinitely with a vast amount of details.

Some types of service statistics which might be obtained through special studies are: determination of levels of immunizations; evaluation of specific new services or program techniques; changes in behavior resulting from health department activity; determination of reasons for lapses in attendance at clinics or for failures to complete immunizations; comparison of effectiveness of individual interviews versus group conferences; and time and cost studies.

Summary

Several points may be suggested, then, for the guidance of public health workers concerned with numerical measurement of public health services:

Service statistics should reflect service to people. They should not attempt merely to enumerate volume of activity of the health department staff.

Service statistics are needed by modern health departments for program planning, program operation, and program evaluation.

Full value cannot be derived from service statistics unless they are related to baseline data. Organized methods are needed for bringing together the several groups of data so that quantitative relationships can be established between

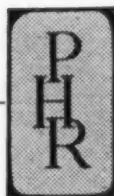
the services rendered and the health problems to be solved. The acid test of service statistics is whether they portray results of public health effort.

Good service statistics must be developed in accordance with clearly defined program objectives. In scope and volume, they should be limited in terms of cost, time, and effort of production commensurate with the need they must meet and the uses to which they are put.

Frequently, preparation of recurrent statistical reports can be simplified by substituting special studies for routine collection of complex mass data.

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Health Education via Television

By JOSEPH GORDON

WHILE THE CONTROVERSY over education via television continues in the press, in periodicals, in educational journals, and around many a conference table, a modest number of TV stations working with medical and other health agencies have unpretentiously launched regularly scheduled health video programs. Most of these programs have been dedicated to promoting better health habits and attitudes in the individual as well as in the community which the TV station and the health agency serve.

How well these objectives are being met remains to be evaluated, but favorable audience response to current programs is a good indication that health education over TV fills a definite need for the citizen.

In 1951, in an effort to evaluate the status of health education via television on a nationwide basis, some 110 questionnaires were sent by the Baltimore City Health Department to all active TV stations over the country. Of the 64 questionnaires returned, 28 television stations which were not carrying regular public health education programs indicated they would carry such a program provided it were sponsored by a health agency. Sixteen TV outlets replied

that they then carried sporadic health telecasts throughout the year in conjunction with special health drives; but only seven stations were producing regular periodic health programs. It is surprising that, with this interest evidenced by TV stations, so few health agencies have grasped the opportunity to utilize this new and effective dimension for health education.

Why are many health departments, medical societies, and other health agencies not taking advantage of the opportunities afforded by TV for health education?

Is it because of a lack of aggressiveness on their part?

Is it because of their skeptical attitude toward the value of television as a medium of education?

Is it an unfamiliarity with a technique which resembles that of motion-picture production?

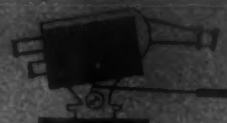
Or is it essentially because the costs of production are believed to be excessive?

Whatever the answer, a delineation of the Baltimore City Health Department's experience in television is offered here with the hope that it may help to refute some of these unwarranted conjectures and that it will encourage those who wish to utilize television as an aid to promoting better health.

Background

Baltimore's program (1-3), a 15-minute weekly series bearing the title "Your Family Doctor" rests on a triangular foundation. It is jointly sponsored by the Baltimore City Health Department, the Medical and Chirurgical Faculty of Maryland (the State medical society), and WMAR-TV, a local television station. This triple bond gives the television series its

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Left (reading down):

A fifth-grader shows the doctor what he's learned about dental care.

A mother-to-be learns about the Rh blood factor.

Adolescent problems. The doctor talks these over later with a guest specialist.

Looking for glaucoma. The doctor explains the leading cause of blindness among adults.

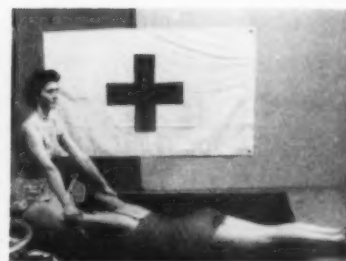
Below (left to right):

Sinusitis is discussed with a guest specialist.

Red Cross instructors demonstrate the new method of artificial respiration.

The zoo director tells about snakes and their bites.

Prescription-writing and drug-compounding are explained.



strength. The city health department is responsible for planning and programing. The medical society makes available consultants who act as advisers or guests on the program. And the TV station donates as a public service the air time and the technical personnel for telecasting.

"Your Family Doctor," the weekly program, was inaugurated on December 15, 1948. There have been only three cancellations since then, and these were due to election commitments.

Participating in this first telecast were the mayor of Baltimore, the president of the Medical and Chirurgical Faculty of Maryland, the chairman of the council of the faculty, the city health commissioner, "Dr. John Worthington" played at that time by the former director of the bureau of health information in the city health department, and Dr. Worthington's "office nurse," played by a public health nurse.

The program opened with the mayor's special remarks on its aim and his acknowledgment of the efforts of the physicians of Maryland and the television station in making the TV health series possible. The president of the State medical society spoke about the importance of the family doctor in protecting and promoting personal health and the role he plays as teacher and family counselor. The commissioner of health described the kind of telecast to be presented each week. The "doctor" and his "nurse" gave a short dramatic presentation in the setting of the "doctor's office."

Purpose and Authenticity

"Your Family Doctor" is designed to promote interest in and understanding of personal and community health. Its prime functions are to increase the public's knowledge of the basic practices for keeping well; to encourage consultation with the individual's family doctor when there is any doubt about illness; to present public health problems and their local application to the community; and to inform and familiarize the public with the activities of the local health department. In essence, "Your Family Doctor," through the medium of "Dr. Worthington," attempts to join, with skill, education and entertainment in the encouragement of good healthful living.

Overall responsibility and supervision of program production (4, 5) rests with the director of the bureau of health information in the city health department. Programs are selected on the basis of timeliness and need by a television committee composed of the commissioner of health, the assistant commissioner of health, key city health department administrators, the scriptwriter, the studio producer-director, and the director of the bureau of health information, who acts as chairman of the committee. Besides the selection of program topics, the committee designates well-known authorities as specialist advisers for each program.

The following procedure insures the authenticity and accuracy of each program:

A preliminary conference is held to decide on the information to be presented. The method of presentation is discussed and decided on. The conference is attended by the specialist adviser, the scriptwriter, the studio producer-director, and the director of the bureau of health information.

After the preliminary conference, a script is prepared and submitted to the director of the bureau of health information for his approval.

The director of the bureau of health information and the specialist adviser critically examine the script. They check on the accuracy of each statement and for the possible omission of essential facts.

Final approval is given, and copies of the script are prepared by the bureau of health information for distribution to the studio and the cast. The participants memorize their lines, in this way avoiding the possibility of misrepresentation.

Cast and Properties

The part of Dr. John Worthington, the central character of each weekly presentation, is portrayed by a staff member of the city health department who has had professional acting experience. "Dr. John Worthington" was chosen as the name of "Your Family Doctor" because he was one of Baltimore's first health officers, appointed during the yellow fever episode of 1792.

Other members of the cast are recruited from the television studio and from Baltimore the-

atrical groups. Persons with dramatic experience are preferred as actors, but often staff members of the city health department volunteer their services. All participants contribute their talents without charge.

Properties are assembled by the television studio and the bureau of health information. Property items (props) have been contributed to the programs by the Johns Hopkins University and Hospital; the University of Maryland Medical School and Hospital; the Baltimore city and county departments of education; the Public Health Service and the Food and Drug Administration of the Department of Health, Education, and Welfare; the Armed Forces Institute of Pathology in Washington, D. C.; and numerous voluntary health agencies.

Cost of Production

Scriptwriting is the main item of expenditure. Scripts are written by a studio staff member for a fee of \$20 for each script. Having a studio member write the scripts has been a workable and satisfactory arrangement since the scriptwriter is then familiar with television techniques and the available studio property items.

During 1951 and 1952 an additional outlay of \$10 a program was made for the services of a professional actor who portrayed "the family doctor." The writing and acting expenses for this period totaled \$1,560 per year. An additional \$200 a year is estimated for the production of props—photographs, charts, diagrams, drawings, postage, transportation, and incidentals. Stencils and paper for script reproduction are estimated at \$100 a year. The total annual cost to the health department, excluding the services of staff members of the bureau of health information, was \$1,860 a year. This sum, in the light of approximate expenditures for other health educational media, films, exhibits, leaflets, and posters, is not excessive: Rather, it is a small sum when it is compared with the costs of commercially sponsored programs and when one considers that the health message reaches thousands of persons of all ages more easily and personally than any other medium of mass communication. The outlay can be greatly minimized by writing the pro-

gram within the health department and by drawing on a staff member of the department for the regular weekly appearances.

The Telecast Format

Each health telecast follows a standard format which on occasion is varied to meet the needs of the program. In general, the following time sequence is typical of the standard program format:

Opening scene (30 seconds). A "live" or filmed dramatic sequence to catch audience attention.

Standard titles (30 seconds). Superimposed over opening scene whenever appropriate.

Body of program (10 to 12 minutes). This may take any form: a health drama, a series of experiments, an illustrated lecture, a film, or any combination of these.

Guest specialist (usually 2 to 5 minutes, but time varies according to subject). Outstanding personalities are frequently invited to appear on "Your Family Doctor" in order to highlight the program and lend added authenticity. Since the program is sponsored by the city health department and the State medical society as part of their health education program, their teamwork makes it possible to obtain such personalities. Guests in the past have included members of the Johns Hopkins University and Hospital, the University of Maryland and the University Hospital, the city department of education, the voluntary health agencies, the American Red Cross, the State and city medical societies, the health department, and other municipal agencies.

Ending. Each program ends with "Learn to do your part in the prevention of disease."

Range of Subjects

A summation of the health subjects covered in the series is given in the accompanying table. Included under the communicable disease control classification are 9 programs on tuberculosis and 4 on respiratory ills. Other programs in this category were concerned with poliomyelitis, diphtheria, typhoid fever, measles, smallpox, ringworm, Rocky Mountain spotted fever, and hospital services and research in communicable diseases. Five programs on sanitary

Range of 230 subjects covered in weekly telecasts by broad classifications, Dec. 15, 1948–May 30, 1953

Classification	Number of telecasts	Percentage of total telecasts
Total.....	230	100.0
Communicable disease control.....	27	11.7
Food and nutrition.....	22	9.7
Maternal and child care.....	21	9.2
Accident prevention.....	20	8.8
Environmental sanitation and housing.....	14	6.1
Mental health.....	13	5.7
Special health department services.....	10	4.4
Dental care.....	8	3.5
School health.....	7	3.0
Heart and circulation.....	7	3.0
First aid.....	7	3.0
Conservation of eyesight.....	7	3.0
Cancer.....	6	2.6
Conservation of hearing.....	5	2.2
Anatomy and physiology of body systems.....	4	1.7
Diabetes.....	4	1.7
Geriatrics.....	4	1.7
Industrial hygiene activities.....	4	1.7
Lead poisoning in children.....	4	1.7
Civil defense.....	3	1.3
Historical—medical discoveries.....	3	1.3
Miscellaneous personal and community health.....	30	13.0

meat and milk inspection services are included in the food and nutrition group. Accident prevention covers home accidents, vacation hazards, and water safety. Special health department services include telecasts describing laboratory services, vital statistics, and special health district activities. Programs in the miscellaneous group were devoted to the work of the State medical society; the American Red Cross blood drive; the recruitment of student nurses; the activities of the Instructive Visiting Nurse Association; the work of the city's chief medical examiner; several community health drives; and a variety of ills including cerebral hemorrhage, sinusitis, allergies, appendicitis, and multiple sclerosis.

Audience Response

Prior to, and during 1950, according to WMAR-TV survey records of the television audience of metropolitan Baltimore (popula-

tion, 1.3 million), the number of viewers each week of "Your Family Doctor" was estimated at no more than 20,000 individuals. Early in 1951, this number had increased to approximately 40,000 persons. By October 1951, the viewing audience had grown to an estimated 75,000. In November 1951, a rating survey revealed that more than 85,000 people were attracted to the program. Early 1952 ratings indicated a stabilization of this figure. After a brief summer decline, an October 1952 rating gave the program an audience of 125,000 persons, exceeding that of many commercially sponsored TV entertainment programs in Baltimore.

A measure of the program's effectiveness may be derived from an abundant correspondence stimulated mainly by offering free literature on health subjects. Our correspondents speak of "Your Family Doctor" as being an invaluable contribution to the community health of Baltimore, of their friends' favorable remarks, of the aid the program gave in putting over an important bond issue for a public hospital; others frequently ask for additional information on the topic of the week.

Summary

Baltimore's program is one in which health information and education emanate from the family doctor as he deals with his patients and their diseases. Not only is the family doctor interested in promoting individual health, he is also concerned with improving the health of the community. In accomplishing these aims, "Your Family Doctor" utilizes every available source of medical material and every practical audiovisual technique. In so doing, it has enlisted the cooperation of every important health agency in Baltimore, both official and nonofficial. That these efforts are well expended is evidenced by the increasing number of viewers.

Can public health agencies afford not to consider using TV as a medium for disseminating health information to the public? Television is an additional tool in the hands of the health educator. The skill and care with which he uses it can contribute to the better health of the individual and the community in which he lives.

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Training Courses in Venereal Disease Control

The Public Health Service Venereal Disease Research Laboratory at Chamblee, Ga., has scheduled refresher training courses to be given during fiscal 1954.

Two-week courses in the serology of syphilis will be given on the following dates:

1953	1954
Aug. 17-28	Jan. 11-22
Sept. 14-25	Feb. 8-19
Oct. 5-16	Mar. 8-19
Oct. 26-Nov. 6	Apr. 5-16
Dec. 7-18	May 3-14

Other courses scheduled are:

Oct. 5-16, 1953: Management and control of syphilis serology by the regional laboratory (for assistant laboratory directors and senior laboratory staff members—includes review of interlaboratory training programs, regional laboratory evaluation studies, laboratory inspection procedures, demonstration of antigen check testing, and control serum preparation.)

Oct. 19-23, 1953: Laboratory diagnosis of venereal disease (for public health physicians, laboratory directors and assistant directors).

Nov. 9-20, 1953: Preparation and standardization of cardiolipin antigens used in serologic tests for syphilis (also to be given May 17-28, 1954).

Correspondence on these courses should be sent to: Director, Venereal Disease Research Laboratory, P. O. Box 185, Chamblee, Ga.

Diabetes Mortality by State for 1950

In 1950, the death rate from diabetes in the United States was 16.2 per 100,000 population. Final figures by State, recently released by the National Office of Vital Statistics, show considerable variation in this death rate from State to State. The diabetes death rate was lowest in New Mexico, where a rate of 5.6 per 100,000 was recorded, and highest in Rhode Island, which had a rate of 35.9 per 100,000. Seven States, New Mexico, Arizona, California, Alabama, Arkansas, Tennessee, and North Caro-

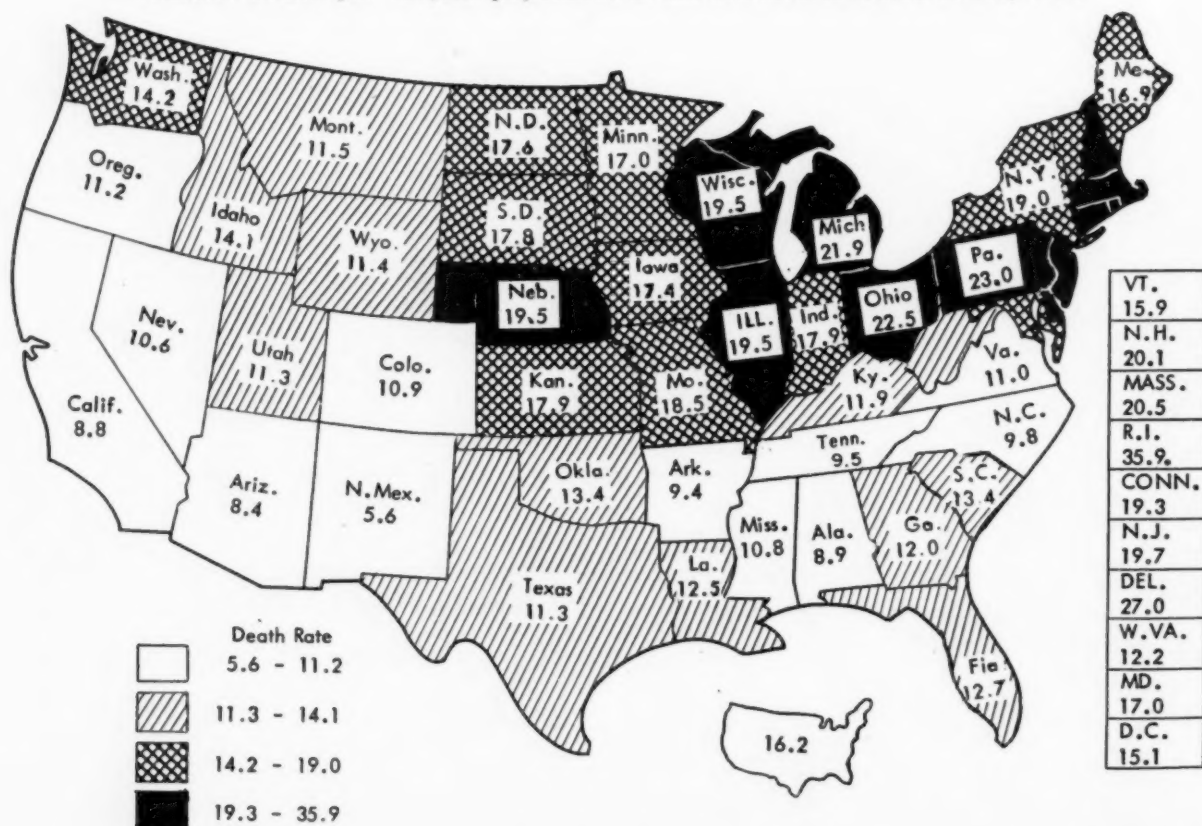
lina, had less than 10 deaths per 100,000, while rates greater than 20 per 100,000 were recorded for New Hampshire, Massachusetts, Michigan, Ohio, Pennsylvania, Delaware, and Rhode Island.

An array of the States by their 1950 diabetes death rate and division by quartiles shows a definite pattern on the map. Generally, the southern and western States have low death rates, and the northeastern and north central States have high rates.

Many factors undoubtedly influence the variation in the diabetes death rate among States and among regions. The differences may be due to real variations in the death rates for diabetes

This report was prepared by the Division of Chronic Disease and Tuberculosis, Public Health Service.

Diabetes deaths per 100,000 population in the continental United States, 1950



because of varying case fatality rates or varying prevalence rates. They are in part reflections of differences in the social, economic, and cultural patterns of the population groups, and differences in the availability of medical facilities and in methods of reporting causes of death.

Another important factor to be considered in comparing the death rates among the States is

the age, race, and sex composition of their populations. States having a high proportion of older people would be expected to have a high death rate for this disease. The rate among the nonwhite population (14.4 per 100,000 population) was slightly lower than that for the white (16.4); while for females, the rate (19.9) was considerably higher than for males (12.5).

Environmental Health Training Courses

Twenty-three training courses will be conducted during fiscal 1954 by the Environmental Health Center of the Public Health Service at Cincinnati, Ohio—15 in the various aspects of sanitation and 8 in radiological health.

These short courses are given for professional personnel from State and local health departments, water pollution control agencies, the Public Health Service, other governmental units, educational institutions, and industries cooperating with these agencies in environmental sanitation programs.

The advanced sanitation courses planned during 1953 and 1954 are:

Sept. 17-18: Fluoride analysis.
Sept. 23-25: Seminar on individual household sewage disposal systems.
Oct. 12-16: Membrane filter in bacteriological analysis of water.
Nov. 2-6: Nuisance organisms in water supplies.
Nov. 30-Dec. 11: For chemists—water pollution investigations.
Jan. 11-15: Bacteriological examination of water.
Jan. 18-22: Bacteriological examination of milk and dairy products.
Jan. 25-29: Food sanitation training.
Feb. 16-18: Phenol determination.
March 8-19: For sanitary engineers—water pollution abatement programs.
April 7-9: Bioassay of industrial wastes.
May 3-7: Membrane filter in bacteriological analysis of water.
May 19-21: Analyses of metals in industrial wastes.
June 8-11: For aquatic biologists—water pollution control.
Emergency sanitation training (will be scheduled if requests are sufficient).

In radiological health training, the basic course, which stresses basic radiation physics and survey techniques, will be presented:

Oct. 5-16, 1953	January 11-22, 1954	May 3-14, 1954
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The intermediate course, emphasizing laboratory assay of radio elements and X-ray survey techniques, will be given:

Oct. 19-30, 1953	Jan. 25-Feb. 5, 1954	May 17-28, 1954
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An advanced course for professional personnel concerned in particular with occupational health problems will be presented:

Feb. 8-19, 1954

The date of a short course for water works personnel will be announced later.

A bulletin describing the courses and giving further details is available upon request from the Officer in Charge, Environmental Health Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Cincinnati, Ohio.

Rat-Resistant Construction Materials

In a study to determine the resistance of construction materials to penetration by rats, panels of construction materials, including aluminum, were exposed to gnawing by wild roof rats. In specially designed cages, single sheets of test materials were used as barriers between the rats and food and water. The rats, kept on reduced rations, attacked the panels in an effort to reach the bait.

The study showed that rats require a gnawing edge to make any appreciable progress in penetrating materials. They can develop such an edge on soft materials, but with harder materials they require a construction joint or a fracture as a point of attack. All but a few test materials were penetrated when a gnawing edge was exposed.

Without gnawing edges, some materials were penetrated in 1 to 8 nights. Others were penetrated in about the same length of time, but required a gnawing edge. Some of the harder materials and heavier-gauge aluminum alloys required 34 to 126 nights' exposure with a gnawing edge. The hardest grades of asbestos cement and metal base plates of sheet iron withstood up to 122 nights of exposure without penetration or serious damage.

It was concluded that none of the materials, by themselves, were absolutely ratproof, but that composition building materials in the harder grades of asbestos cement products could be made relatively ratproof by protecting construction joints or other raw edges and by protecting the material itself in easily accessible areas.

Aluminum alloys were quite easily penetrated except for the harder tempers in the thicker sheets. Aluminum sheet material used as construction facing should be protected at all raw edges, preferably by sheet iron. Although aluminum alloys shaped as door channels with-



Public Health

MONOGRAPH

No. 11

The accompanying summary covers the principal findings presented in Public Health Monograph No. 11, published concurrently with this issue of Public Health Reports. The authors are members of the staffs of the Communicable Disease Center and the Division of Water Pollution Control (Southeast Drainage Basin), Public Health Service.

Readers wishing the data in full may purchase copies of the monograph from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. A limited number of free copies are available to official agencies and others directly concerned on specific request to the Public Inquiries Branch of the Public Health Service. Copies will be found also in the libraries of professional schools and the major universities, and in selected public libraries.

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Tarzwel, C. M., Stenborg, R. L., Nicholson, H. P., and Lynn, W. D.: The resistance of construction materials to penetration by rats. Public Health Monograph No. 11 (Public Health Service Publication No. 277). U. S. Government Printing Office, Washington, 1953. Price 20 cents.

stood gnawing exposure considerably longer than the same alloys exposed as plain sheets, they are not considered suitable replacements for galvanized sheet iron as protective door channels.

Legal Notes *on public health*

Federal Care and Treatment Of Insane Prisoners

The power of the Federal Government to provide for the detention and care of "insane" persons in its custody was narrowly construed in a recent opinion of the Court of Appeals for the 10th Circuit—*Wells v. Attorney General*, 201 Fed. (2) 556 (1953).

The Court held that the Congress has power to provide proper care and treatment for persons who become temporarily insane while in the custody of the United States awaiting trial on criminal charges, and for Federal prisoners who become mentally incompetent during the term of their imprisonment after conviction. However, the Court also held that the Federal Government has neither constitutional nor inherent power to enter the general field of lunacy and to assume to act as *parens patriae* for the permanently insane. Section 4246 of the Federal Code of Criminal Procedures was accordingly interpreted as applying only to the temporarily insane.

Accused of a Federal offense, the petitioner in the case had been found to be mentally incompetent after a period of observation at the Medical Center for Federal Prisoners, Springfield, Mo. Pursuant to statute, he was com-

mitted to the custody of the United States Attorney General until he should become mentally competent to stand trial or until the charge against him should be disposed of according to law. While in jail awaiting transfer to an institution, he petitioned for a writ of habeas corpus challenging the validity of his commitment. The District Court denied his petition. The Court of Appeals remanded the case with directions for a hearing and finding as to whether the petitioner's mental incompetency was temporary or permanent.

A dissenting opinion in the case took the view that once the Federal Government has acquired jurisdiction over mental incompetents, as in an arrest for or conviction of a Federal offense, its duty is to protect and care for them whether they are temporarily or permanently incompetent; also that the manner in which the duty is to be discharged is to be determined by the Federal Government.

This note has been prepared by the Public Health Division, Office of the General Counsel, Department of Health, Education, and Welfare.

Public Health Service Publications Issued During 1952

A listing of all Public Health Service publications released during the calendar year 1952 is now available upon request to the Public Inquiries Branch, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D. C. Entries are classified by general subject matter. Periodicals issued during the year are also listed.

publications

Health of Workers in Chromate Producing Industry

Public Health Service Publication No. 192. 1953. 131 pages; tables, charts. 50 cents.

An investigation made by the Public Health Service relating to the incidence of carcinoma among workers in chromate production substantiates this problem. The detailed report of findings includes the origin of the study, which was requested by the chromate industry, an abstract-summary, discussion and recommendations, and an appendix giving chemical analyses methods of air-borne particulate materials.

Factors which might influence the abnormally high rate of bronchiogenic cancer among these workers are reported in the correlation of clinical and environmental findings. Other derivatives of chromite ore than those incriminated by previous investigators are considered.

Recommendations are that established industrial hygiene engineering principles be applied to all chromate plants; that workers in the chromate industry for 5 or more years be examined by X-ray every 3 months and have followup clinical examinations by local health departments; and that the morbidity and mortality experience studies among chromate workers be continued.

Public Sewage Treatment Plant Construction, 1952

Public Health Service Publication No. 291. 1953. 18 pages; tables.

The Nation's progress in reducing the pollution of its water resources through construction of municipal sewage treatment plants is summarized in this report, which reveals that a total of 515 communities in the United States awarded contracts for this type of construction in 1952. The total expenditure involved, \$137 million, is less than that expended

for any year since 1948 and falls short of the long-term average of \$141 million for the period 1915-50.

In addition to this information the report contains tables showing contract awards by drainage basin, population served, type of construction, and cost. Data are given on present and estimated future water use, and population and industrial growth. The tables also show contract awards by amount spent for the years 1948 to 1952 and the expenditures for various types of public utility construction are compared.

The accompanying text discusses the data in terms of the importance of pollution control for health and economic reasons and explains why communities are lagging in municipal sewage-treatment plant construction. A complete list of the 1952 contract awards is given in the appendix.

The Dietitian in the Hospitals of the Public Health Service

Public Health Service Publication No. 254. 1953. 26 pages; illustrated. 15 cents.

One of several publications on careers in the Public Health Service, this small booklet describes the duties and responsibilities of the dietitian in Public Health Service hospitals.

It points out that in addition to supplying the nutritional needs of the patients, the dietitian serves as a member of the professional medical team, working closely with the physicians and dentists on research projects and on special studies and experiments with patients requiring therapeutic diet treatment.

The booklet describes the work of the hospital dietary service. The commissioned corps system is explained and the qualifications and requirements for appointment in the corps are covered, as are salary, quarters, and other benefits.

Venereal Disease Clinic Directory

Public Health Service Publication No. 257. Revised 1952. 148 pages. 60 cents.

This directory is published biennially by the Public Health Service's Division of Venereal Disease to provide the latest information on clinics and other facilities available for the diagnosis and treatment of the venereal diseases.

The material included in the recently published 1952 edition has been compiled from information supplied near the end of the calendar year by health departments of the 48 States; the Territories of Alaska, Hawaii, Puerto Rico, and the Virgin Islands; and by the Division of Hospitals of the Public Health Service. The names and addresses of each diagnostic and treatment facility, the days and hours of service, as well as the fee basis for use of each facility are listed.

Summaries of premarital and prenatal laws as they pertain to venereal disease are given for each State and Territory having such laws. In addition, laboratory facilities available in each State are described.

According to the directory, 39 States and 2 Territories have premarital laws requiring blood tests and physical examinations for venereal disease; 42 States and 3 Territories have prenatal laws requiring blood tests for the pregnant woman.

Biological Products

Establishments Licensed for the Preparation and Sale of Viruses, Serums, Toxins and Analogous Products, and the Trivalent Organic Arsenic Compounds.

Public Health Service Publication No. 50. Revised December 1, 1952. 1953. 46 pages. 20 cents.

In accordance with section 351 of the Public Health Service Act regulating the sale of viruses, serums, toxins, or analogous products or arsphenamine in the District of Columbia and in interstate traffic, the

Public Health Service licenses establishments manufacturing these products in the United States and abroad. The granting of a license means that the establishment is inspected regularly as to the technical ability of the responsible personnel and as to sanitary conditions of the premises. It means that the products are manufactured under methods considered to be safe and that the finished product is tested as to safety and purity and compliance with official standards of potency.

This publication lists all establishments holding licenses and the names of the products for which they are licensed. Part II is a list of the various biological products with the license numbers of the establishments producing them, and part III is an alphabetic listing of the manufacturers.

Management of Chancroid, Granuloma Inguinale, and Lymphogranuloma Venereum

Public Health Service Publication No. 255. Revised 1953. By Robert B. Greenblatt. 66 pages; illustrated. 30 cents.

This is the second edition of the publication issued in 1943 as Supplement No. 19 to the *Journal of Venereal Disease Information*. It has been completely rewritten and revised to include the latest methods used in the management of chancroid, granuloma inguinale, and lymphogranuloma venereum since the advent of the antibiotic drugs.

The booklet describes in detail the etiology, incubation period, epidemiology, clinical signs and symptoms, clinical course, diagnosis, and treatment of these venereal diseases. Tables carry information on incidence of the diseases, as well as data on the comparative efficacy of various therapeutic methods. A special section is concerned with differential diagnosis. The bibliography is extensive and offers a comprehensive survey of the literature on the venereal diseases with which it is concerned.

Written by Dr. Greenblatt, an outstanding authority, in collaboration with several of his colleagues, this book is considered a medical reference work on chancroid, granuloma inguinale, and lymphogranuloma venereum.

Clean Water for the South

Public Health Service Publication No. 250. 1953. 6 pages; illustrated. 5 cents.

Clean Water for the Tennessee

Public Health Service Publication No. 271. 1953. 6 pages; illustrated. 5 cents.

Based on the Summary Reports on Water Pollution for the Southeast Drainage Basin and the Tennessee

River Drainage Basin, these publications are two of a series of brief discussions of the 15 technical reports on the water pollution problem in the United States.

Written in nontechnical language and planned with the State pollution control agencies as a stimulus for local action, the leaflets outline in digest form the specific pollution problems in the Southeast Drainage Basin and Tennessee River areas.

The extent of pollution damage as it affects health, industry, and recreation in each section is discussed, and the areas' and communities' contributions to the problem are outlined. Some of the cities which are now taking positive steps to combat water pollution are named as illustrations of present progress, and public support of local action to control one of the most serious threats to the Nation's welfare is strongly urged.

for the general public

Ulcers

Health Information Series No. 71. Public Health Service Publication No. 280. 1953. 1-fold leaflet. 5 cents; \$1.75 per 100.

This health information leaflet discusses what is known about the cause of ulcers and their course of development. The warning signs of ulcers are described, with emphasis on the necessity of prompt diagnosis and early treatment under the supervision of a physician. Various methods of treatment, such as rest, medicine, and diet, are outlined, and the reasons are given for their use.

Care of the Eyes

Health Information Series No. 64. Public Health Service Publication No. 113. Reprinted 1953. 1-fold leaflet. 5 cents; \$1.75 per 100.

In spite of the defense nature has provided to protect the eyes, they can still be damaged by neglect and abuse. This health information

leaflet explains that good care of the eyes begins with infants, through the protection of their eyes from bright lights and the dangers of pointed objects. School-age children should be taught good reading habits and people of all ages should practice cleanliness in the care of their eyes.

The leaflet also advises regular eye examinations by an eye specialist and explains the difference between the oculist or ophthalmologist, optometrist, and optician.

Publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication (including its Public Health Service publication number). Single copies of most Public Health Service publications can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington 25, D. C.

Ideas

Recruitment Plan

MICHIGAN. Believing that rewarding careers in the field of health, less well known than medicine, dentistry, pharmacy, or nursing, may be overlooked by parents and teachers in counseling students of junior and high school age, professional groups are cooperating in a new recruitment plan.

The Medical Society, the Michigan Health Council, the Hospital Association, and the nursing profession have joined forces in the State to present the advantages of a career as an assistant, or associate, in one of the numerous medical service professions where shortages exist or where shortages are anticipated.

To coincide with the observance of Michigan Hospital Week, the bulletin of the health council announced that the findings of a recent survey of these professions revealed 960 medical service positions then open in the State. The bulletin named the vocational categories where immediate placement could be made. The survey, made by the Michigan Hospital Association, concluded that in 5 years, even if present needs were met, there still would be 1,890 openings for dietitians, laboratory technicians, medical record librarians, and X-ray technicians, among others.

The wide range of opportunities available in the expanding health and medical associate professions are highlighted in a brochure on career planning prepared by the Michigan State Medical Society.

Together with descriptive text and action photographs, the booklet features a comprehensive chart which outlines each of 26 vocations. The vocational outlines include educational requirements, Michigan schools offering instruction, and information sources outside the State, employment conditions, salary ranges, and opportunities for advancement and security.

Regional Legislative Conferences

FLORIDA. Six regional legislative conferences have been held to acquaint State legislators and community groups with the legislative goals of public health agencies. To assure the greatest coverage, the conferences were held in six key cities. Brief descriptions of proposed health legislation and appropriation requests and a listing of legislation in which the various health organizations had especial interest were distributed.

The conferences were guided by the Florida Public Health Association: Its executive committee provided the necessary funds; its legislative committee made the plans. Tentative dates were set in advance. Community leaders were selected as local regional chairmen in each key city.

A copy of the agenda and a list of the participating groups were sent by letter to all county health officers 2 months before the first meeting. The purpose of the conferences was explained, and the proposed dates, the names of the regional chairmen, and the counties included in each of the six regional areas were given. Each health officer was requested to act as conference coordinator for his county and to suggest the names of leading citizens to be invited to

attend. Other notices were sent to all State legislators and to various individuals and groups.

General news stories describing the conference plans were sent to all newspapers in the State 2 weeks before the first meeting. Regional news stories were sent to the papers in the regional area 1 week ahead of each regional conference. These stories quoted the regional chairmen on the importance of the meeting and repeated the time, place, location, and purpose. Two days before the regional meeting, local news stories with local names and local plans were sent to the county health officers for release in the counties within the regional area. Copies of all stories were sent to radio stations in each region, and news commentators were asked to use the information for local broadcasts.

Presenting their program goals before the regional legislative conferences were representative official and voluntary State groups concerned with public health problems. Among these, in addition to the Florida Public Health Association, were the Florida State Board of Health, the Mental Hygiene Association, the State division of the American Cancer Society, the Florida Tuberculosis and Health Association, the Anti-Mosquito Control Association, the Tuberculosis Board, the Children's Commission, the Hospital Association, and the division of vocational rehabilitation of the Department of Education.

Legislators, official and voluntary agencies, and civic groups were well represented. The estimated total attendance at the 6 regional sessions was 900 including 49 members of the Florida legislature. By the questions they asked, members of the audiences demonstrated their real interest in the public health programs and the proposed legislation.